EXHIBIT 2-A

(Final Environmental Assessment available at: https://new.mta.info/document/110751)

(Volume 2 of 6)

Table 2-5. Comparison of Evaluation Results for CBD Tolling Alternative Tolling Scenarios

SCREENING CRITERION	SCENARIO A Base Plan	SCENARIO B Base Plan with Caps and Exemptions	SCENARIO C Low Crossing Credits for Vehicles Using Tunnels to Access the CBD, with Some Caps and Exemptions	SCENARIO D High Crossing Credits for Vehicles Using Tunnels to Access the CBD	SCENARIO E High Crossing Credits for Vehicles Using Tunnels to Access the CBD, with Some Caps and Exemptions	SCENARIO F High Crossing Credits for Vehicles Using Manhattan Bridges and Tunnels to Access the CBD, with Some Caps and Exemptions	SCENARIO G Base Plan with Same Tolls for All Vehicle Classes
Purpose and Need: Reduce traffic congestion in the Manhattan CBD in a manner that will generate revenue for future transportation improvements	Meets	Meets	Meets	Meets	Meets	Meets	Meets
Objective 1: Reduce daily VMT within the Manhattan CBD Criterion: Reduce by 5% (relative to No Action)	Meets	Meets	Meets	Meets	Meets	Meets	Meets
aily VM reduction 202	7.8%	7.6%	8.0%	8.7%	9.2%	7.1%	8.4%
Objective 2: Reduce the number of vehicles entering the Manhattan CBD daily Criterion: Reduce by 10% (relative to No Action)	Meets	Meets	Meets	Meets	Meets	Meets	Meets
aily vehicle reduction 202	15.4%	15.7%	17.3%	18.7%	19.9%	18.3%	16%
Objective 3: Create a funding source for capital improvements and generate sufficient annual net revenues to fund $15 billion for capital projects for MTA's Capital Program	Meets	Does not meet[1]	Meets	Meets	Meets	Meets	Meets
Net revenue to support M 's Capital Program [2]	$1.06 billion	$830 million	$1.10 billion	$1.34 billion	$1.48 billion	$1.02 billion	$1.10 billion
Objective 4: Establish a tolling program consistent with the purposes underlying the New York State legislation entitled the "MTA Reform and Traffic Mobility Act"	Meets	Meets	Meets	Meets	Meets	Meets	Meets

[1] Although Tolling Scenario B would not meet Objective 3 with the toll rates identified and assessed in this EA, additional analysis was conducted to demonstrate that it would meet this objective with a slightly higher toll rate and the resulting VMT reduction and revenue for that modified scenario would fall within the range of the other scenarios presented. Chapter 16, "Summary of Effects," provides more information on the modified Tolling Scenario B. it would meet this objective with a modified toll rate, while continuing to meet the other objectives.

[2] The net revenue needed to fund $15 billion depends on a number of economic factors, including but not limited to interest rates and term. For the purposes of this EA, the modeling assumes the Project should provide at least $1 billion annually in total net revenue, which would be invested or bonded to generate sufficient funds. The net revenue values provided in this table are rounded and based on Project modeling.

3. Environmental Analysis Framework

3.1 FEDERAL APPROVALS AND CLASS OF ACTION

The CBD Tolling Program is classified as a NEPA Class III EA action in accordance with 23 Code of Federal Regulations (CFR Section 771.115). NEPA Class III actions are those in which the significance of the environmental impact is not clearly established. This EA has been prepared to determine whether the Project is likely to have a significant impact and requires the preparation of an Environmental Impact Statement.

3.2 COORDINATION WITH FEDERAL AND STATE RESOURCE AGENCIES

FHWA and the Project Sponsors have sought the expertise of and/or information from the following Federal and New York State agencies in preparing this EA:

- U.S. Federal Transit Administration (FTA)
- U.S. Environmental Protection Agency (USEPA)
- U.S. National Park Service (NPS)
- ***[U.S. Department of Health and Human Services (HHS)]***
- New York State Department of Environmental Conservation (NYSDEC)
- New York State Department of State (NYSDOS)
- New York State Historic Preservation Office at the New York State Office of Parks, Recreation and Historic Preservation (OPRHP or SHPO)

FHWA and the Project Sponsors coordinated with these agencies about their areas of expertise with respect to methodologies for documenting environmental conditions and assessing effects. The Project Sponsors also coordinated with New York City agencies about potential effects on resources under their jurisdiction, including the New York City Department of Parks and Recreation, the New York City Department of Environmental Protection, ***[the New York City Department of Health and Mental Hygiene, the New York City Taxi and Limousine Commission, the New York City Department of Education]***, and the New York City Landmarks Preservation Commission. There have been and will continue to be meetings with the agencies during this NEPA review. The recommendations of these agencies have been considered and incorporated into this EA, as appropriate.

FHWA has also coordinated with Federally recognized Native American tribes, and FHWA and the Project Sponsors coordinated with transportation agencies from throughout the New York City region ***[(Connecticut, New Jersey, and New York)]***. The Project Sponsors also conducted extensive outreach to environmental justice (minority and low-income) populations in the regional study area. (Refer to **Chapter 18, "Agency Coordination and Public Participation,"** for more information about agency participation in the NEPA process.)

3.3 ANALYSIS FRAMEWORK

This EA describes the potential environmental effects of the CBD Tolling Alternative compared to the No Action Alternative. This environmental analysis complies with FHWA's *Environmental Impact and Related Procedures* (23 CFR Part 771) and applicable Federal guidance and procedures, including FHWA guidance provided in its environmental review toolkit.[1] Although the MTA Reform and Traffic Mobility Act exempts the Project from the environmental review procedures of the New York State Environmental Quality Review Act and New York City Environmental Quality Review, NYSDOT's *The Environmental Manual* and New York City's *City Environmental Quality Review Technical Manual* (*CEQR Technical Manual*) were used for certain analyses because these are widely accepted methodologies for environmental studies in New York State and New York City, respectively.[2, 3]

NYSDOT and the New York City Mayor's Office of Environmental Coordination oversee *The Environmental Manual* and the *CEQR Technical Manual*, respectively. Both are updated regularly to reflect changes in regulations or to incorporate new or modified methodologies that reflect experience gained through environmental reviews and real-world conditions. Updates to these documents are undertaken in consultation with other New York State and New York City agencies, including the following:

- New York State Department of Environmental Conservation (NYSDEC)
- OPRHP and SHPO
- MTA
- New York City Department of City Planning (NYCDCP)
- New York City Department of Environmental Protection
- NYCDOT
- New York City Landmarks Preservation Commission

Each chapter of this EA identifies the methodology used for the analysis presented in the chapter.

The 2021 *CEQR Technical Manual*, issued in December 2021, establishes that the lead agency should consider whether supplemental analysis to reflect an updated methodology of the 2021 *CEQR Technical Manual* should be undertaken, taking into account as necessary the scheduled timing of completion of environmental review under the applicable approval process. Based on the timing of completion of analyses and scheduled public and agency review, the 2020 *CEQR Technical Manual* is used as the basis for this EA.

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1 https://www.environment.fhwa.dot.gov.

2 NYSDOT. *The Environmental Manual.* https://www.dot.ny.gov/divisions/engineering/environmental-analysis/manuals-and-guidance/epm.

3 The 2021 *CEQR Technical Manual*, issued in December 2021, establishes that the lead agency should consider whether supplemental analysis to reflect an updated methodology of the *CEQR Technical Manual* should be undertaken, taking into account as necessary the scheduled timing of completion of environmental review under the applicable approval process. Based on the timing of completion of analyses and scheduled public and agency review, the 2020 *CEQR Technical Manual* is used as the basis for this EA.

3.3.1 Study Areas

A regional study area and multiple local study areas were used to assess the potential effects of the Project. The regional study area was used to examine changes in travel patterns resulting from the CBD Tolling Alternative while different local study areas were used to identify more localized effects like the potential effects of constructing tolling infrastructure and tolling system equipment, changes in roadway traffic and access to transit stations; and social, economic, or environmental effects. **Chapter 1, "Introduction,"** provides an overview of development patterns, demographic characteristics, and commuting patterns within the study areas. The affected environment sections of the subsequent chapters of this EA describe the Project setting within the study areas relevant to, and appropriate for, the technical topic that is the subject of the chapter. The affected environment section provides context for the assessment of the Project's effects presented in the environmental consequences sections that follow in each chapter.

3.3.1.1 Regional Study Area

The regional study area includes 28 counties that are incorporated in the Best Practice Model (BPM), which is the New York City region's primary long-range travel forecasting model (**Figure 3-1**). These 28 counties represent the main catchment area for trips to and from the Manhattan CBD:

- New York City counties (Bronx, Kings [Brooklyn], New York [Manhattan], Queens, and Richmond [Staten Island])
- Long Island counties (Nassau and Suffolk)
- New York counties north of New York City (Dutchess, Orange, Putnam, Rockland, and Westchester)
- New Jersey counties (Bergen, Essex, Hudson, Hunterdon, Mercer, Middlesex, Monmouth, Morris, Ocean, Passaic, Somerset, Sussex, Union, and Warren)
- Connecticut counties (Fairfield and New Haven)

3.3.1.2 Local Study Areas

As previously stated, multiple local study areas were used for the analyses presented in this EA. **Figure 3-2a through Figure 3-2g** show the areas where installation of tolling infrastructure and tolling system equipment associated with the Project is proposed, and this is referred to as the local study area for tolling infrastructure and tolling system equipment. In addition, **Figure 3-3a through Figure 3-3j** show the proposed locations of the tolling infrastructure and tolling system equipment.

The local study area for tolling infrastructure and tolling system equipment includes more locations than the Project Sponsors would need to implement the Project because the ability of the Project Sponsors to locate tolling infrastructure and tolling system equipment on property controlled by the Port Authority of New York and New Jersey (PANYNJ) is uncertain. The Project Sponsors are coordinating with PANYNJ about potentially locating tolling infrastructure and equipment on property associated with the Lincoln and Holland Tunnels. If PANYNJ agrees to locate the tolling infrastructure and equipment on its property, then the Project Sponsors can eliminate several detection points on local streets near the Lincoln and Holland Tunnels. This EA includes the tolling infrastructure and tolling system equipment both on PANYNJ property and at locations nearby that could be eliminated if PANYNJ approves the use of its property by the Project Sponsors.

Figure 3-1. Regional Study Area

Source: ArcGIS Online, https://www.arcgis.com/index.html.

3.3.2 Analysis Years

This EA examines future conditions in the opening year of the Project and in a long-term planning horizon year:

- **Estimated Time of Completion (Opening Year 2023):** This EA uses an estimated time of Project completion date of 2023, when the system would be fully operational.
- **Long-Term Planning Horizon Year (2045):** FHWA typically considers the environmental effects of its undertakings for a long-term horizon year, which is 20 to 30 years after a project's estimated time of completion. For this Project, the long-term planning horizon analysis year aligns with the BPM's long-range forecast year, which is 2045.

3.3.3 CBD Tolling Alternative Tolling Scenarios

This EA includes multiple tolling scenarios within the CBD Tolling Alternative to identify the range of potential effects that could occur from implementing the CBD Tolling Alternative. (See **Chapter 2, "Project Alternatives," Section 2.4.2.4** for more information on the tolling scenarios.) The Project Sponsors conducted quantitative modeling of the potential transportation effects of each tolling scenario using the BPM (see **Subchapter 4A, "Transportation: Regional Transportation Effects and Modeling"**).

The tolling scenarios are relevant to the environmental analyses that quantify the potential benefits or negative effects of changes in traffic and/or transit riders on a particular topic of analysis (e.g., intersection operations, pedestrian circulation, air quality, noise). For each of these topics, this EA describes the effects of the tolling scenario that would result in the greatest potential negative effects for that particular topic of analysis. For example, the analysis of potential impacts on traffic intersection operations is based on the tolling scenario that would result in the greatest increase in vehicle volumes at the intersections in the study area. This methodology results in the most potential negative effects of the CBD Tolling Alternative, and other tolling scenarios would result in lesser or fewer negative effects. This EA identifies the tolling scenario used for the analysis presented in each chapter. In addition, **Chapter 16, "Summary of Effects,"** compares the effects of the tolling scenarios.

[For the Final EA, the Project Sponsors committed to additional mitigation measures (see Chapter 16, "Summary of Effects," Table 16-2), including a discounted toll rate for low-income drivers, a further reduced overnight toll rate, and a cap of once per day on tolls for taxis and for-hire vehicles (FHVs). In addition to the broader sensitivity analysis described in Chapter 16, "Summary of Effects," Section 16.2.4.4, the following demonstrates that these new mitigation commitments neither require a change in the tolling scenarios used for the analyses in the EA, nor change the fundamental conclusions of the EA:

- *Discounted Toll Rate for Low-Income Drivers: Traffic effects from the discounted toll rate for low-income drivers would fall within the range of effects explored through the tolling scenarios in the EA, given the small number of low-income frequent drivers who have no reasonable alternative, relative to the total*

number of drivers, and given that drivers would still pay a toll, so this discount would not be an incentive for additional people to drive to the Manhattan CBD.

- *Further Reduced Overnight Toll Rate: The analyses of the Project's effects on traffic, transit, parking, pedestrians, air quality, and noise evaluate effects during peak periods, which are the periods when existing and Project-generated traffic and pedestrian volumes would be highest. Further reduced overnight toll rates would not result in increased volumes during the peak periods and therefore would not change the conclusions of the analyses.*
- *Cap on Number of Tolls for Taxis and FHVs:*
  - *Subchapter 4B, "Transportation: Highways and Local Intersections:" The highway analysis and local intersection analyses evaluated Tolling Scenario D, which also represented the effects of Tolling Scenarios E and F. Since Tolling Scenario F included a cap of once per day on tolls for taxis and FHVs, the predicted effects on highway segments and local intersections presented in this subchapter are representative of the effects with the new mitigation in place. An additional traffic analysis was conducted for the Downtown Brooklyn study area where Tolling Scenario C was determined to be the representative tolling scenario. In Tolling Scenario C, taxis are exempt and there is a cap of three times a day on tolls for FHVs; this scenario also performs similarly to Tolling Scenario B, which has a cap of once per day for tolls on taxis and FHVs. Thus, this tolling scenario remains appropriate.*
  - *Subchapter 4C, "Transportation: Transit:" The transit analysis considered the Project's effects using Tolling Scenario E, which was predicted to have the highest transit ridership. In Tolling Scenario E, taxis are exempt and there is a cap of three times a day on tolls for FHVs; this scenario had similar results to those of Tolling Scenario F, which has a cap of once per day on tolls for taxis and FHVs. Thus, this tolling scenario remains appropriate.*
  - *Subchapter 4D, "Transportation: Parking:" The parking analysis evaluated Tolling Scenario D, which also represented the effects of Tolling Scenarios E and F. Since Tolling Scenario F included a cap of once per day on tolls for taxis and FHVs, the predicted effects on parking presented in this subchapter are representative of the effects with the new mitigation in place.*
  - *Subchapter 4E, "Transportation: Pedestrians and Bicycles:" The analysis of pedestrians and bicycles evaluated Tolling Scenario D, which also represented the effects of Tolling Scenarios E and F. Since Tolling Scenario F included a cap of once per day on tolls for taxis and FHVs, the predicted effects on parking presented in this subchapter are representative of the effects with the new mitigation in place.*
  - *Chapter 10, "Air Quality:" The analysis of regionwide (mesoscale) effects of the Project considered Tolling Scenario A, which was predicted to result in the smallest change in vehicle-miles traveled (VMT) compared to the No Action Alternative, and therefore the least benefit. This conclusion remains the same with the addition of the cap of once per day on tolls for taxis and FHVs. The analyses of air quality at local intersections used the same tolling scenarios as the traffic analysis presented in Subchapter 4B. As noted earlier, that analysis remains representative of the effects that would occur with the new mitigation in place. The analysis of highway segments considered the tolling scenarios with the highest annual average daily traffic and highest projected increase in*

truck volumes due to the Project. These scenarios, Tolling Scenario B, C, and E, each include caps on the number of daily tolls for taxis and FHVs; Tolling Scenario B has a cap of one toll per day, and Tolling Scenarios C and E have an exemption for taxis and a cap of three tolls per day for FHV. All three scenarios are representative of conditions that would occur with a cap of one toll per day for taxis and FHVs.

- *Chapter 12, "Noise:" The analysis of noise used the same tolling scenarios as the traffic analysis presented in Subchapter 4B. As noted earlier, that analysis remains representative of the effects that would occur with the new mitigation in place.*
- *Appendix 17D, "Technical Memorandum:" The analysis of truck traffic proximity used Tolling Scenario E, which has the maximum truck diversions by volume for all census tracts in the 10-county environmental justice study area. As noted earlier in the discussion of the traffic analyses (Subchapter 4B), Tolling Scenarios D, E, and F have similar results. While Tolling Scenario E has an exemption for taxis and a cap of three tolls per day for FHVs, Tolling Scenario F has a cap on tolls for taxis and FHVs of once per day. Consequently, the analysis of Tolling Scenario E is representative of conditions with the mitigation in place. The analysis of non-truck traffic proximity used Tolling Scenarios E and G because, in combination, those scenarios had the largest diversions and the largest potential increases of all tolling scenarios, respectively. Tolling Scenario G performed similarly to Tolling Scenario B, which has a cap of once per day on tolls for taxis and FHVs. Consequently, the analysis of Tolling Scenario G is representative of conditions with the mitigation in place.*

As noted above, for more information on the details and conclusions of the sensitivity analyses conducted by the Project Sponsors, see Chapter 16, "Summary of Effects."]

3.3.4 Social and Economic Data

The social and economic conditions analysis in this EA incorporates data from two primary sources—the U.S. Census Bureau and the BPM.

The EA incorporates census data to describe existing conditions (also known as the "affected environment"). The data are from multiple census products, including the 2015–2019 American Community Survey (ACS) and the 2012–2016 Census Transportation Planning Package (CTPP). These were the most recent versions of these products available at the time the analysis was prepared. Data from the 2012–2016 CTPP is used when there is not a newer, comparable data set available from the 2015–2019 ACS.

The BPM is a complex transportation model, created by New York Metropolitan Transportation Council (NYMTC), used to project future conditions under the No Action Alternative and the CBD Tolling Alternative. Metropolitan planning organizations (e.g., NYMTC) are responsible for modeling and documenting their region's compliance with the Clean Air Act, and they use transportation models for that purpose. NYMTC's transportation planning model is based on data from the 2010 Census, traffic and transit ridership data, household surveys, and comprehensive projections of social and economic trends for the regional study

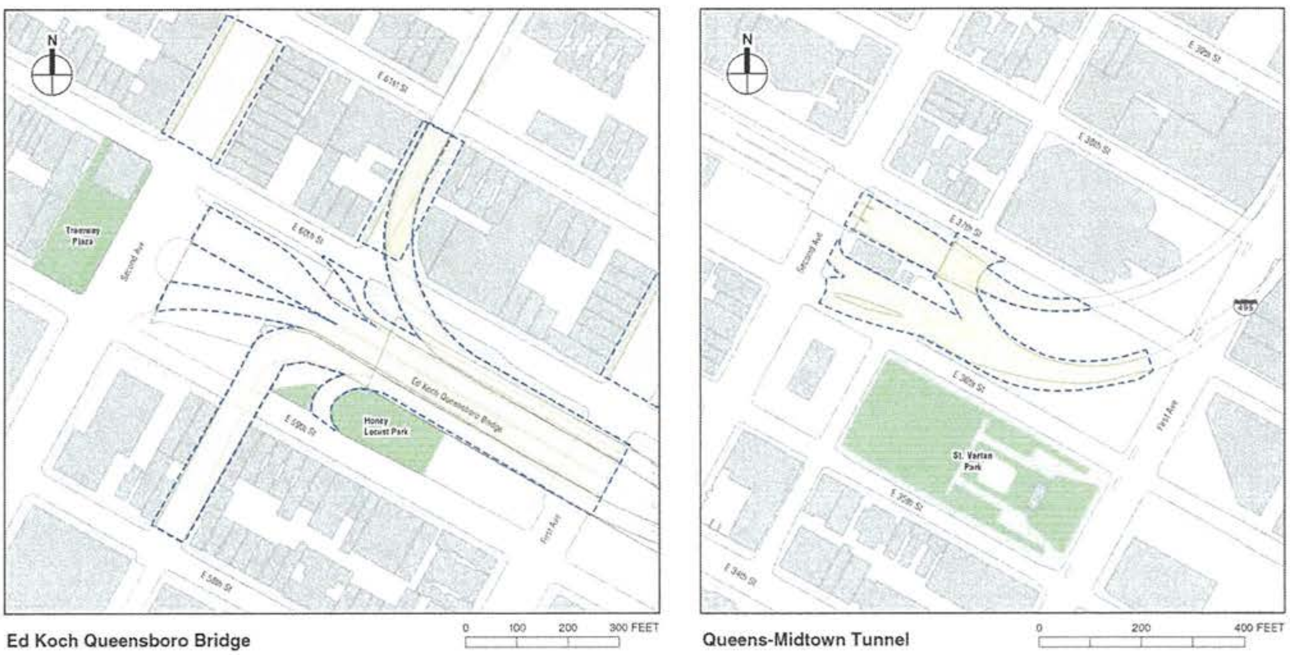
area to project travel behavior in future years. NYMTC has adjusted and calibrated the model so that it can predict existing as well as future travel patterns. This EA cites the social and economic data from the BPM when describing future conditions based on BPM results (also known as the "environmental consequences" of the Project).

Some data sets from the U.S. Census Bureau and the BPM differ, but they are both valid sources for describing the potential changes anticipated to result from the Project. For example, the census population and household data are available for more recent years; therefore, it is more current than similar data from the BPM. Text, tables, and figures in the chapters of this EA cite the source of the data presented.

Figure 3-2a. Local Study Areas for Tolling Infrastructure and Tolling System Equipment

Sources: NYC Open Data, NYC Planimetrics, https://data.cityofnewyork.us/Transportation/NYC-Planimetrics/wt4d-p43d; New NYCDCP, BYTES of the BIG APPLE, https://www1.nyc.gov/site/planning/data-maps/open-data.page; ArcGIS Online, https://www.arcgis.com/index.html.

Figure 3-2b. Local Study Area for Tolling Infrastructure and Tolling System Equipment: Ed Koch Queensboro Bridge and Queens-Midtown Tunnel

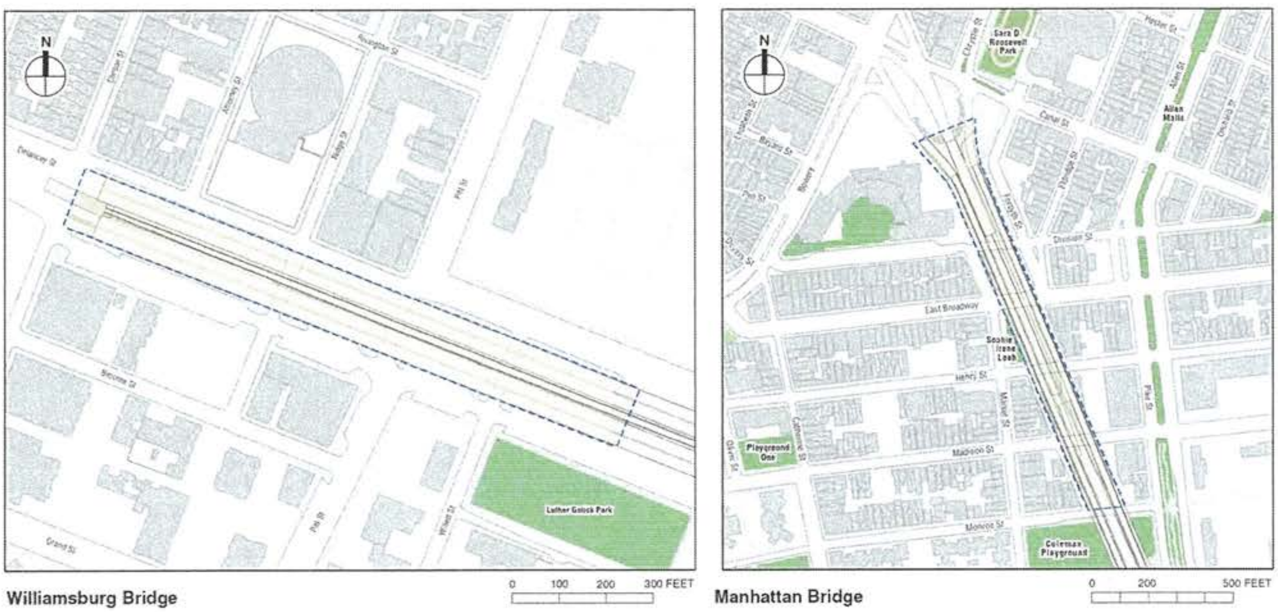


Local Study Area for Tolling Infrastructure and Tolling System Equipment

Park or Recreational Resource in Vicinity of Local Study Area

Sources: NYC Open Data, NYC Planimetrics, https://data.cityofnewyork.us/Transportation/NYC-Planimetrics/wt4d-p43d; NYCDCP, BYTES of the BIG APPLE, https://www1.nyc.gov/site/planning/data-maps/open-data.page; ArcGIS Online, https://www.arcgis.com/index.html.

Figure 3-2c. Local Study Area for Tolling Infrastructure and Tolling System Equipment: Williamsburg Bridge and Manhattan Bridge

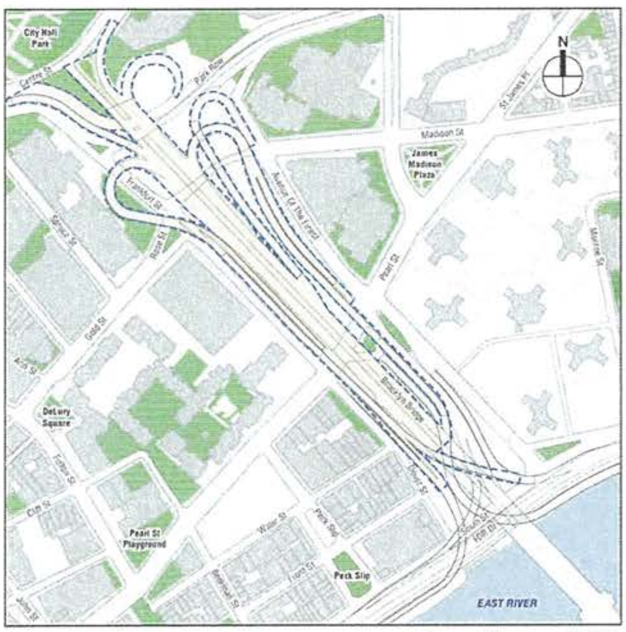


Local Study Area for Tolling Infrastructure and Tolling System Equipment

Park or Recreational Resource in Vicinity of Local Study Area

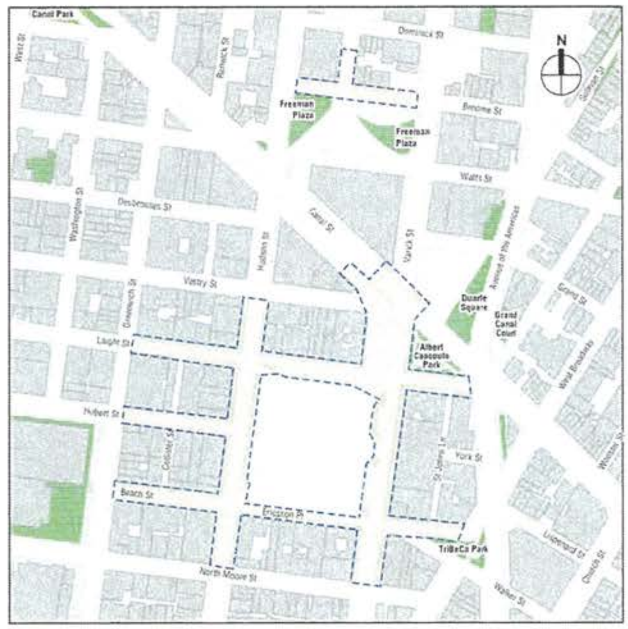
Sources: NYC Open Data, NYC Planimetrics, https://data.cityofnewyork.us/Transportation/NYC-Planimetrics/wt4d-p43d; NYCDCP, BYTES of the BIG APPLE, https://www1.nyc.gov/site/planning/data-maps/open-data.page; ArcGIS Online, https://www.arcgis.com/index.html.

Figure 3-2d. Local Study Area for Tolling Infrastructure and Tolling System Equipment: Brooklyn Bridge and Holland Tunnel



Brooklyn Bridge

0 200 500 FEET



Holland Tunnel

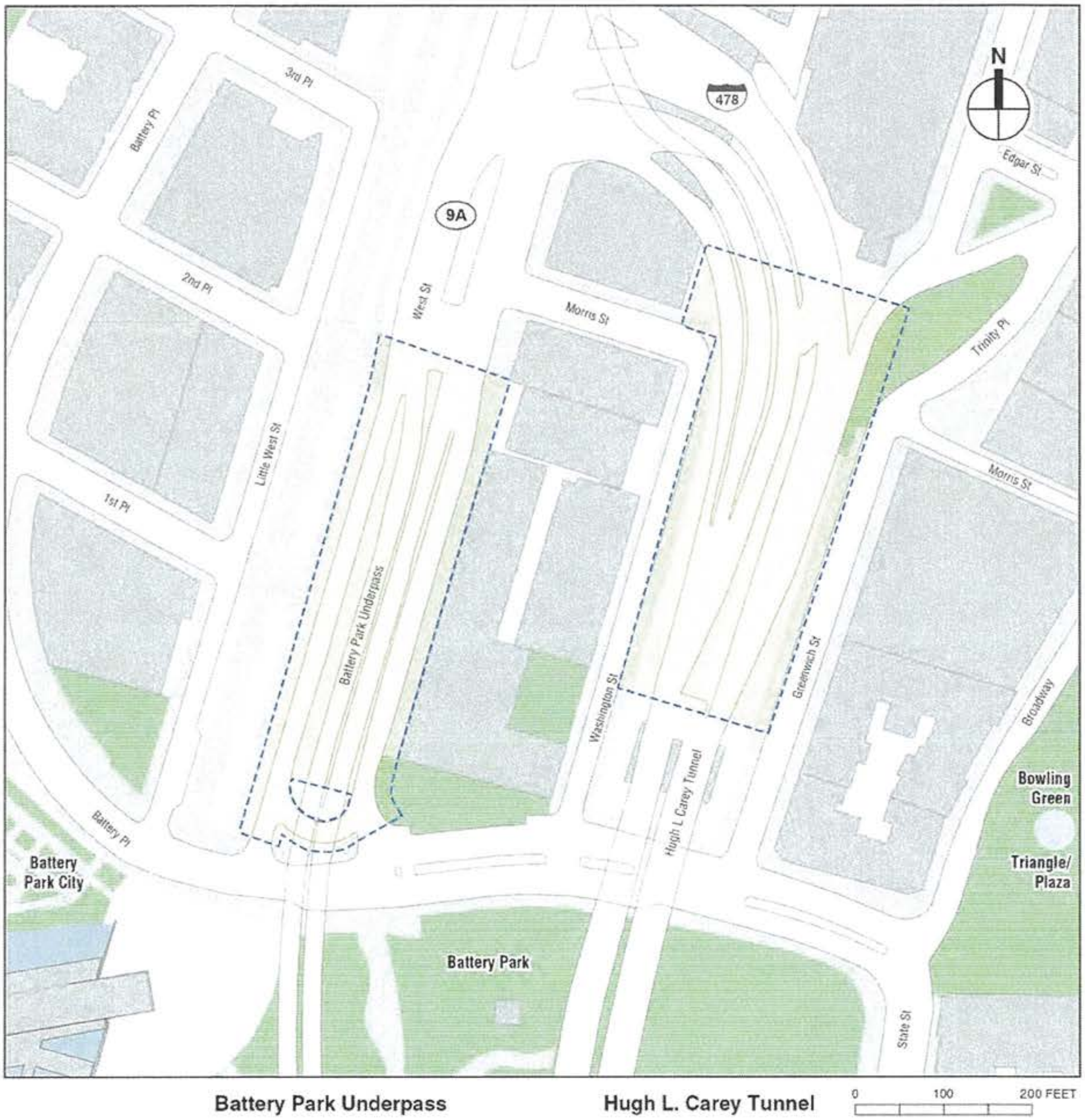
0 200 500 FEET

Local Study Area for Tolling Infrastructure and Tolling System Equipment

Park or Recreational Resource in Vicinity of Local Study Area

Sources: NYC Open Data, NYC Planimetrics, https://data.cityofnewyork.us/Transportation/NYC-Planimetrics/wt4d-p43d; NYCDCP, BYTES of the BIG APPLE, https://www1.nyc.gov/site/planning/data-maps/open-data.page; ArcGIS Online, https://www.arcgis.com/index.html.

Figure 3-2e. Local Study Area for Tolling Infrastructure and Tolling System Equipment: Battery Park Underpass and Hugh L. Carey Tunnel



Local Study Area for Tolling Infrastructure and Tolling System Equipment

Park or Recreational Resource in Vicinity of Local Study Area

Sources: NYC Open Data, NYC Planimetrics, https://data.cityofnewyork.us/Transportation/NYC-Planimetrics/wt4d-p43d; NYCDCP, BYTES of the BIG APPLE, https://www1.nyc.gov/site/planning/data-maps/open-data.page; ArcGIS Online, https://www.arcgis.com/index.html.

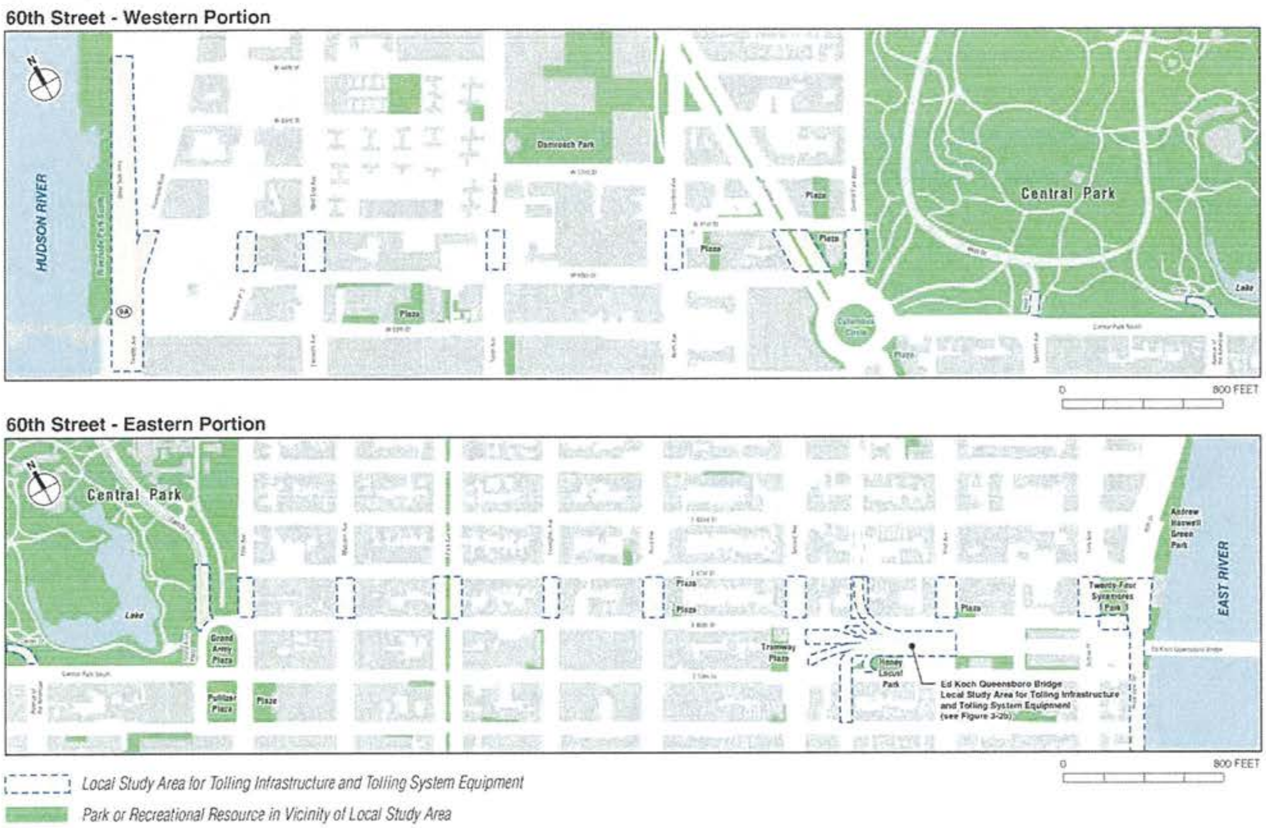
Figure 3-2f. Local Study Area for Tolling Infrastructure and Tolling System Equipment: Lincoln Tunnel

Local Study Area for Tolling Infrastructure and Tolling System Equipment

Park or Recreational Resource in Vicinity of Local Study Area

Sources: NYC Open Data, NYC Planimetrics, https://data.cityofnewyork.us/Transportation/NYC-Planimetrics/wt4d-p43d; NYCDCP, BYTES of the BIG APPLE, https://www1.nyc.gov/site/planning/data-maps/open-data.page; ArcGIS Online, https://www.arcgis.com/index.html.

Figure 3-2g. Local Study Area for Tolling Infrastructure and Tolling System Equipment: 60th Street



Sources: NYC Open Data, NYC Planimetrics, https://data.cityofnewyork.us/Transportation/NYC-Planimetrics/wt4d-p43d; NYCDCP, BYTES of the BIG APPLE, https://www1.nyc.gov/site/planning/data-maps/open-data.page; ArcGIS Online, https://www.arcgis.com/index.html.

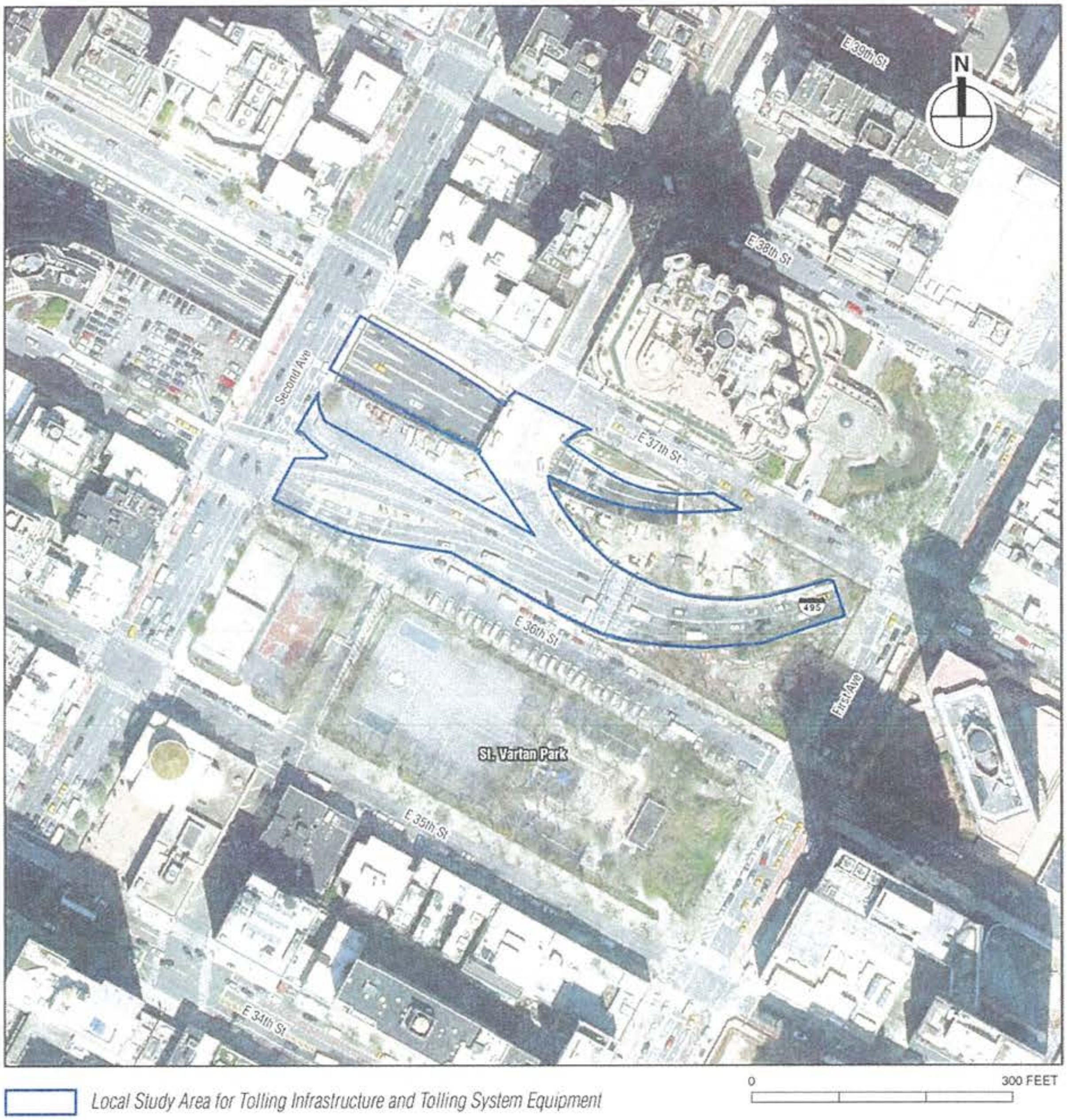
Figure 3-3a. Key Map and Proposed Locations of Tolling Infrastructure and Tolling System Equipment Along FDR Drive and West Side Highway/Route 9A

Sources: TBTA. October 2021. New York State, NYS Interactive Mapping Gateway: New York Statewide Digital Orthoimagery Program (NYSDOP) High Resolution Imagery 2000 – 2018. http://gis.ny.gov/gateway/mg/index.html.

Figure 3-3b. Proposed Locations of Tolling Infrastructure and Tolling System Equipment: Ed Koch Queensboro Bridge

Sources: TBTA. October 2021. New York State, NYS Interactive Mapping Gateway: NYSDOP High Resolution Imagery 2000 – 2018. http://gis.ny.gov/gateway/mg/index.html.

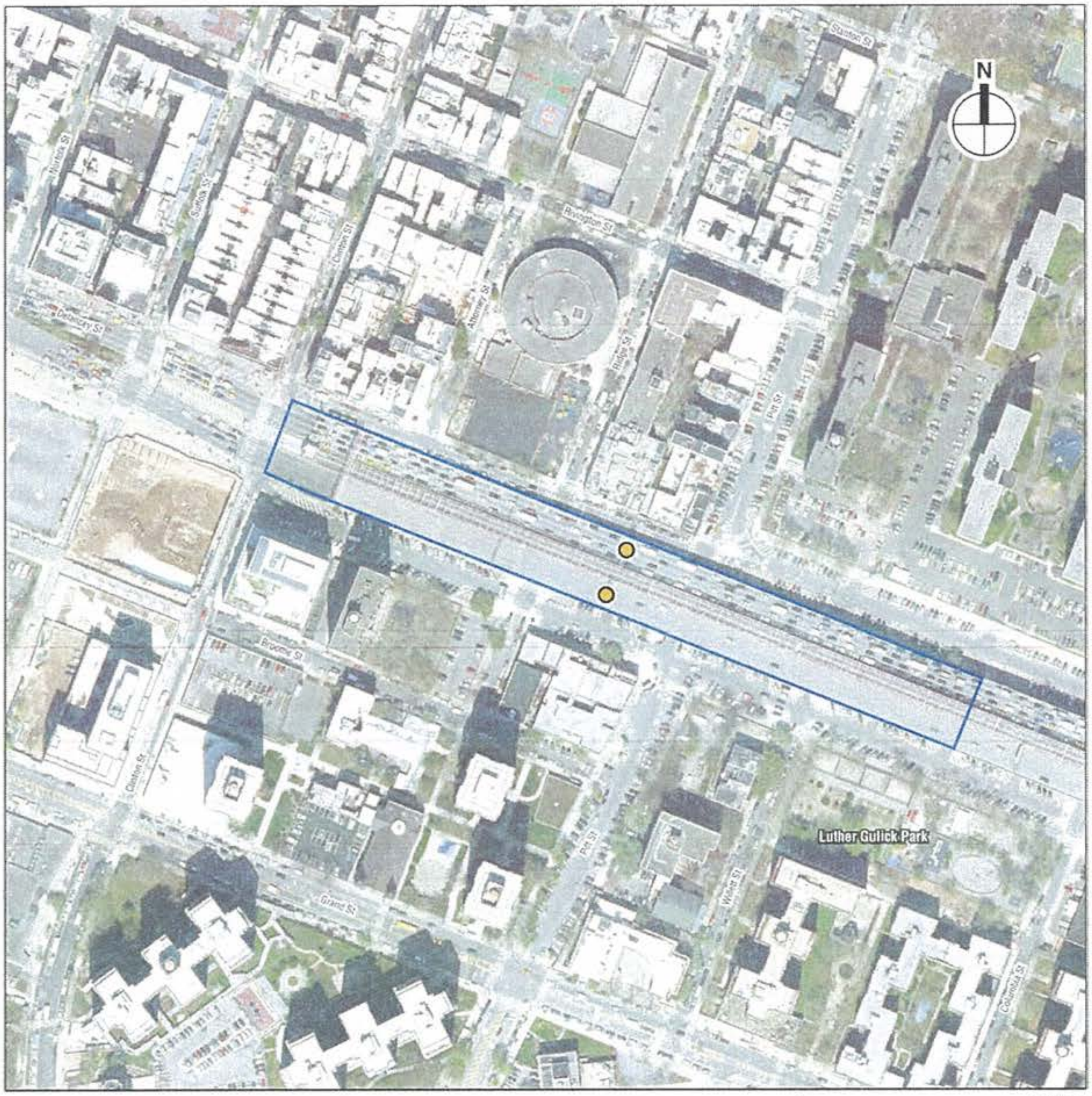
Figure 3-3c. Proposed Locations of Tolling Infrastructure and Tolling System Equipment: Queens-Midtown Tunnel



Note: No new tolling infrastructure and tolling system equipment proposed in this local study area (existing open road tolling infrastructure would be used)

Sources: TBTA. October 2021. New York State, NYS Interactive Mapping Gateway: NYSDOP High Resolution Imagery 2000 – 2018. http://gis.ny.gov/gateway/mg/index.html.

Figure 3-3d. Proposed Locations of Tolling Infrastructure and Tolling System Equipment: Williamsburg Bridge



Local Study Area for Tolling Infrastructure and Tolling System Equipment

Proposed Location of Tolling Infrastructure and Tolling System Equipment (each circle represents a detection location, which may include one or more new poles or new tolling system equipment mounted on existing infrastructure in that general location)

Sources: TBTA. October 2021. New York State, NYS Interactive Mapping Gateway: NYSDOP High Resolution Imagery 2000 – 2018. http://gis.ny.gov/gateway/mg/index.html.

Figure 3-3e. Proposed Locations of Tolling Infrastructure and Tolling System Equipment: Manhattan Bridge

Local Study Area for Tolling Infrastructure and Tolling System Equipment

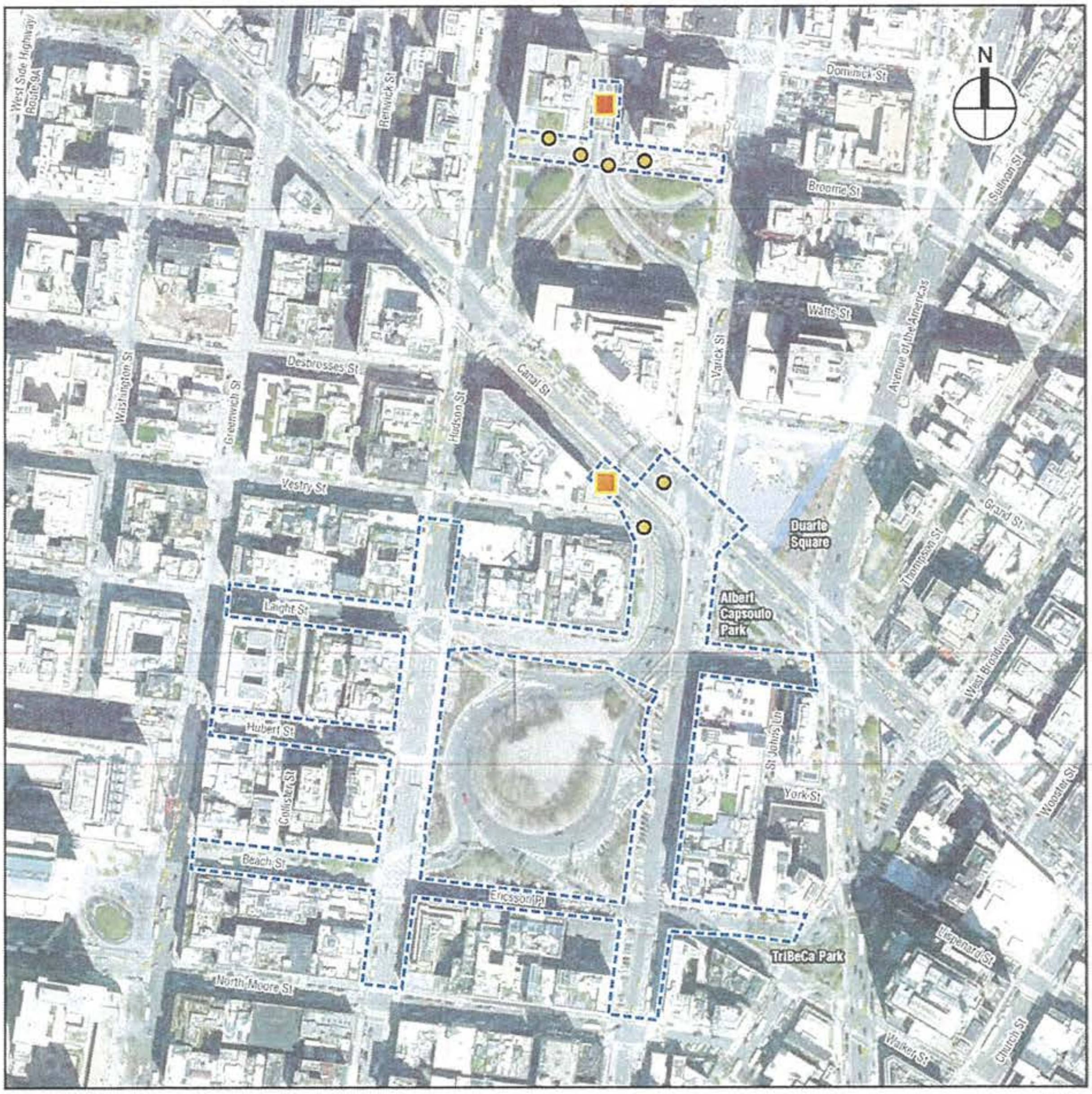
Proposed Location of Tolling Infrastructure and Tolling System Equipment (each circle represents a detection location, which may include one or more new poles or new tolling system equipment mounted on existing infrastructure in that general location)

Sources: TBTA. October 2021. New York State, NYS Interactive Mapping Gateway: NYSDOP High Resolution Imagery 2000 – 2018. http://gis.ny.gov/gateway/mg/index.html.

Figure 3-3f. Proposed Locations of Tolling Infrastructure and Tolling System Equipment: Brooklyn Bridge

Sources: TBTA. October 2021. New York State, NYS Interactive Mapping Gateway: NYSDOP High Resolution Imagery 2000 – 2018. http://gis.ny.gov/gateway/mg/index.html.

Figure 3-3g. Proposed Locations of Tolling Infrastructure and Tolling System Equipment: Holland Tunnel



Local Study Area for Tolling Infrastructure and Tolling System Equipment

Proposed Location of Tolling Infrastructure and Tolling System Equipment (each circle represents a detection location, which may include one or more new poles or new tolling system equipment mounted on existing infrastructure in that general location

Potential Location of Tolling Infrastructure and Tolling System Equipment on PANYNJ Property In Place of All Other Detection Points at and Near the Holland Tunnel

Sources: TBTA. October 2021. New York State, NYS Interactive Mapping Gateway: NYSDOP High Resolution Imagery 2000 – 2018. http://gis.ny.gov/gateway/mg/index.html.

Figure 3-3h. Proposed Locations of Tolling Infrastructure and Tolling System Equipment: Battery Park Underpass and Hugh L. Carey Tunnel

Local Study Area for Tolling Infrastructure and Tolling System Equipment

Proposed Location of Tolling Infrastructure and Tolling System Equipment (each circle represents a detection location, which may include one or more new poles or new tolling system equipment mounted on existing infrastructure in that general location – existing open road tolling infrastructure would be used for the Hugh L. Carey Tunnel)

Sources: TBTA. October 2021. New York State, NYS Interactive Mapping Gateway: NYSDOP High Resolution Imagery 2000 – 2018. http://gis.ny.gov/gateway/mg/index.html.

Figure 3-3i. Proposed Locations of Tolling Infrastructure and Tolling System Equipment: Lincoln Tunnel

0 400 800 FEET

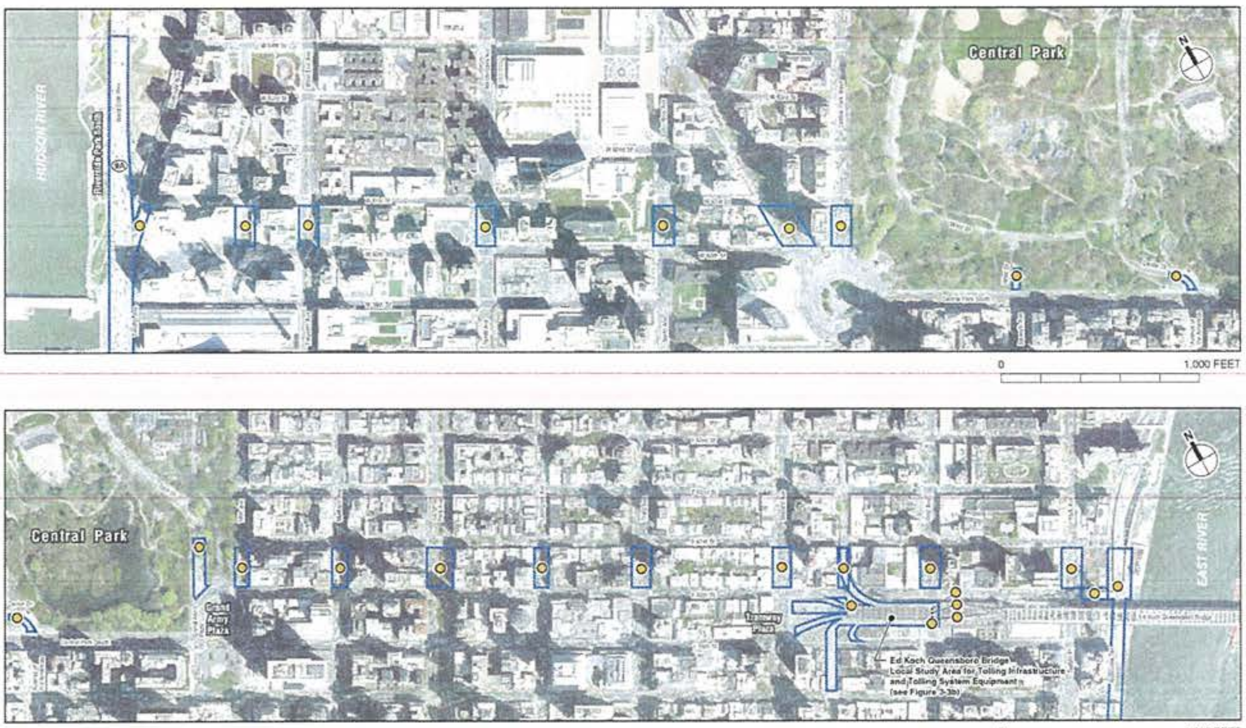
Local Study Area for Tolling Infrastructure and Tolling System Equipment

Proposed Location of Tolling Infrastructure and Tolling System Equipment
(each circle represents a detection location, which may include one or more new poles
or new tolling system equipment mounted on existing infrastructure in that general location)

Potential Location of Tolling Infrastructure and Tolling System Equipment
on PANYNJ Property In Place of All Other Detection Points
at and Near the Lincoln Tunnel

Sources: TBTA. October 2021. New York State, NYS Interactive Mapping Gateway: NYSDOP High Resolution Imagery 2000 – 2018. http://gis.ny.gov/gateway/mg/index.html.

Figure 3-3j. Proposed Locations of Tolling Infrastructure and Tolling System Equipment: 60th Street



Local Study Area for Tolling Infrastructure and Tolling System Equipment

Proposed Location of Tolling Infrastructure and Tolling System Equipment (each circle represents a detection location, which may include one or more new poles or new tolling system equipment mounted on existing infrastructure in that general location)

Sources: TBTA. October 2021. New York State, NYS Interactive Mapping Gateway: NYSDOP High Resolution Imagery 2000 – 2018. http://gis.ny.gov/gateway/mg/index.html.

4. Transportation

As the commercial and economic hub of the region, 8 million daily trips are made to and from Manhattan's CBD.[1] These trips comprise vehicular trips (e.g., auto, truck, motorcycle), transit (e.g., subway, commuter rail, bus, ferry), and pedestrian and bicycle trips. Trips to and from the Manhattan CBD are generated throughout the 28-county transportation planning region used in this analysis.

Because of the size of the region and the extent of the analysis, this transportation chapter includes five subchapters:

- Subchapter 4A, Regional Transportation Effects and Modeling
- Subchapter 4B, Highways and Local Intersections
- Subchapter 4C, Transit
- Subchapter 4D, Parking
- Subchapter 4E, Pedestrians and Bicycles

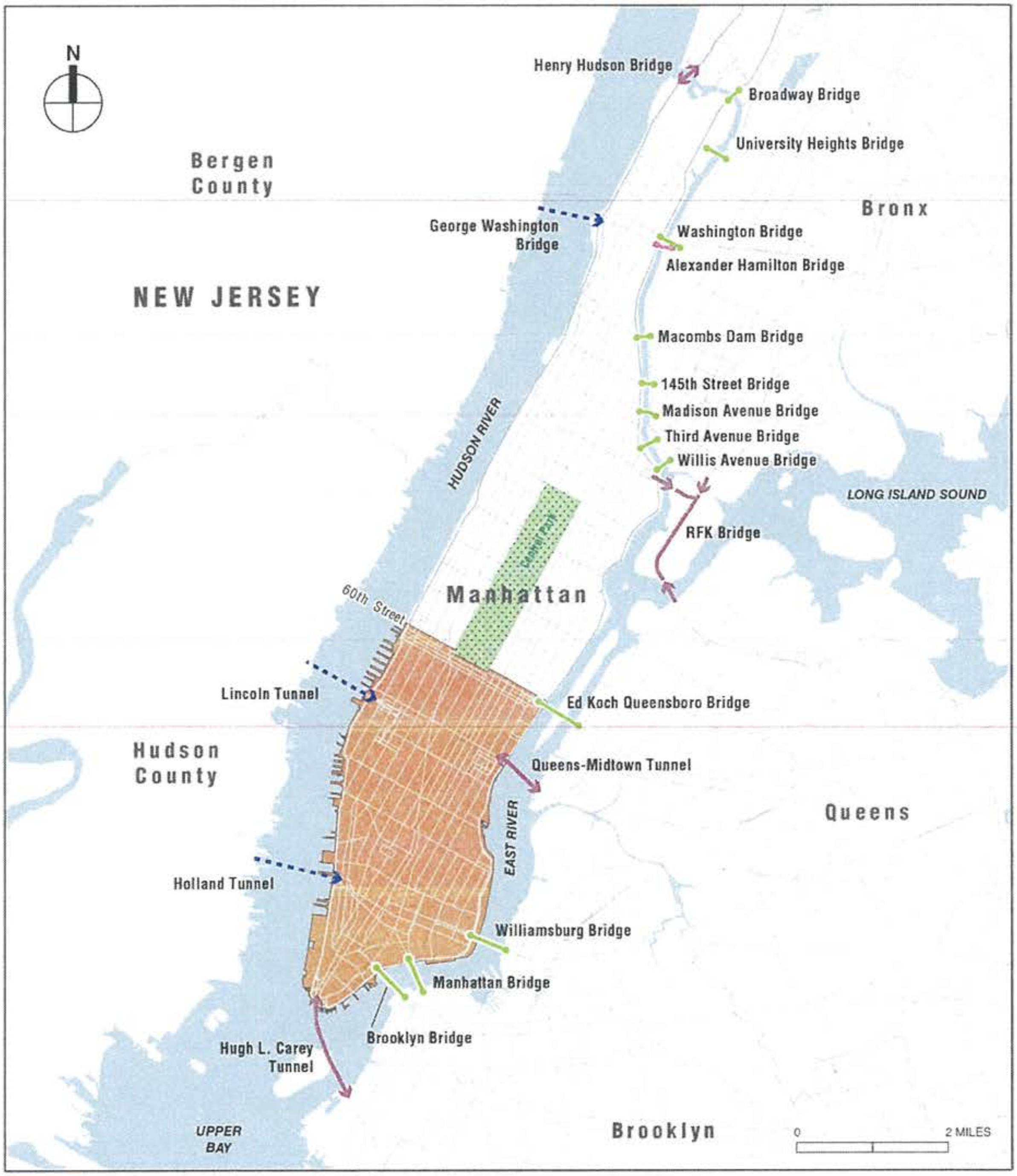
A comprehensive analysis of the relevant transportation effects of the CBD Tolling Alternative is provided in each of those subchapters, along with description of the analytical framework and process used to assess the effects discussed therein. Broadly, the process entailed data collection, regional model development, simulations, and quantitative and/or qualitative analyses. Initial context is provided in the following sections to describe the density and complexity of the regional transportation network, particularly when traveling to the Manhattan CBD.

4.1 ROADWAY ACCESS TO THE MANHATTAN CBD

Manhattan is separated from the rest of New York City by the Harlem River, East River, and New York Harbor and from New Jersey by the Hudson River, with 20 vehicular bridges and tunnels connecting to Manhattan. **Figure 4-1** shows the crossings into Manhattan, and **Figure 4-2** shows all vehicular entry and exit points for the Manhattan CBD. **Table 4-1 and Table 4-2** list the bridges and tunnels, and **Table 4-3** lists the 2022 toll rates for automobiles at each of the tolled crossings.

1 New York Metropolitan Transportation Council, *Hub Bound Travel Data Report 2017*.

Figure 4-1. Existing Vehicular Crossings to Manhattan



Manhattan CBD (as defined by the MTA Reform and Traffic Mobility Act)

Tolled Direction

Parks and Open Space

Port Authority of New York and New Jersey Bridges and Tunnels (Tolling Point)

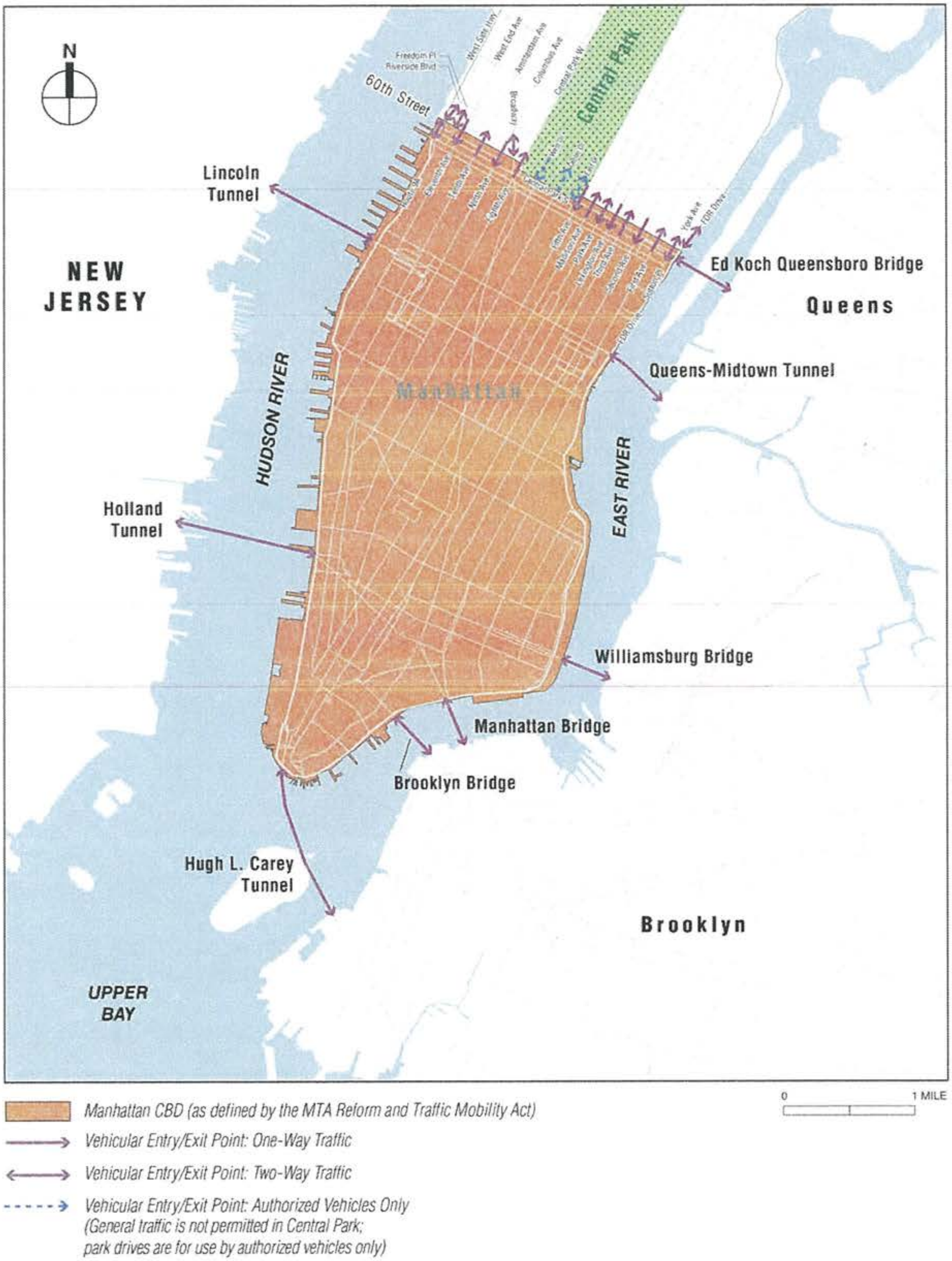
MTA Bridges and Tunnels / Triborough Bridge and Tunnel Authority Bridges and Tunnels (Tolling Point)

New York City Department of Transportation Bridges (Not a Tolling Point)

New York State Department of Transportation Bridge (Not a Tolling Point)

Source: ArcGIS Online, https://www.arcgis.com/index.html.

Figure 4-2. Vehicular Entry and Exit Points for the Manhattan CBD



Source: ArcGIS Online, https://www.arcgis.com/index.html.

Table 4-1. Bridges and Tunnels Connecting to Manhattan CBD

BRIDGE OR TUNNEL	LOCATION	JURISDICTION	BRIDGE/TUNNEL TOLL
Brooklyn Bridge	East River–Between Brooklyn and Manhattan	NYCDOT	Untolled
Manhattan Bridge	East River–Between Brooklyn and Manhattan	NYCDOT	Untolled
Williamsburg Bridge	East River–Between Brooklyn and Manhattan	NYCDOT	Untolled
Ed Koch Queensboro Bridge	East River–Between Queens and Manhattan	NYCDOT	Untolled
Queens-Midtown Tunnel	East River–Between Queens and Manhattan	TBTA	Inbound and outbound[1]
Hugh L. Carey Tunnel	New York Harbor–Between Brooklyn and Manhattan	TBTA	Inbound and outbound[1]
Holland Tunnel	Hudson River–Between New Jersey and Manhattan	PANYNJ	Inbound[1]
Lincoln Tunnel	Hudson River–Between New Jersey and Manhattan	PANYNJ	Inbound[1]

Notes:
[1] Inbound = To or entering Manhattan; Outbound = From or leaving Manhattan.
NYCDOT = New York City Department of Transportation.
TBTA = Triborough Bridge and Tunnel Authority.
PANYNJ = Port Authority of New York and New Jersey.

Table 4-2. Bridges Connecting to Manhattan Outside the Manhattan CBD

BRIDGE	LOCATION	JURISDICTION	BRIDGE/TUNNEL TOLL
Broadway Bridge	Harlem River–Between Bronx and Manhattan	NYCDOT	Untolled
University Heights Bridge	Harlem River–Between Bronx and Manhattan	NYCDOT	Untolled
Washington Bridge	Harlem River–Between Bronx and Manhattan	NYCDOT	Untolled
Alexander Hamilton Bridge (I-95)	Harlem River–Between Bronx and Manhattan	NYSDOT	Untolled
Macombs Dam Bridge	Harlem River–Between Bronx and Manhattan	NYCDOT	Untolled
145th Street Bridge	Harlem River–Between Bronx and Manhattan	NYCDOT	Untolled
Madison Avenue Bridge	Harlem River–Between Bronx and Manhattan	NYCDOT	Untolled
Third Avenue Bridge	Harlem River–Between Bronx and Manhattan	NYCDOT	Untolled
Willis Avenue Bridge	Harlem River–Between Bronx and Manhattan	NYCDOT	Untolled
Robert F. Kennedy Bridge	Harlem River and East River–Between Bronx, Queens, and Manhattan	TBTA	Inbound and outbound[1]
Henry Hudson Bridge (Route 9A)	Harlem River–Between Bronx and Manhattan	TBTA	Inbound and outbound[1]
George Washington Bridge (I-95)	Hudson River–Between New Jersey and Manhattan	PANYNJ	Inbound[1]

Notes: Vehicles use these bridges to reach Manhattan and then travel by Manhattan streets to the Manhattan CBD.
[1] Inbound = To or entering Manhattan; Outbound = From or leaving Manhattan.
NYCDOT = New York City Department of Transportation.
NYSDOT = New York State Department of Transportation
TBTA = Triborough Bridge and Tunnel Authority.
PANYNJ = Port Authority of New York and New Jersey.

Table 4-3. 2022 Passenger Vehicle Toll Rates on Bridges and Tunnels Connecting to Manhattan

AGENCY	BRIDGE OR TUNNEL	TOLL DIRECTION[1]	TOLL AMOUNT: E- Pass Peak	TOLL AMOUNT: E- Pass Off-Peak	OTHER TOLL AMOUNTS
TBTA	Hugh L. Carey Tunnel	Inbound and outbound	$6.55	$6.55	Tolls by Mail $10.17 Mid-Tier $8.36
TBTA	Queens-Midtown Tunnel	Inbound and outbound	$6.55	$6.55	Tolls by Mail $10.17 Mid-Tier $8.36
TBTA	Robert F. Kennedy Bridge	Inbound and outbound	$6.55	$6.55	Tolls by Mail $10.17 Mid-Tier $8.36
TBTA	Henry Hudson Bridge	Inbound and outbound	$3.00	$3.00	Tolls by Mail $7.50 Mid-Tier $4.62
PANYNJ	Holland Tunnel	Inbound	$13.75	$11.75	Tolls by Mail $16.00
PANYNJ	Lincoln Tunnel	Inbound	$13.75	$11.75	Cash Toll $16.00 Tolls by Mail $16.00
PANYNJ	George Washington Bridge	Inbound	$13.75	$11.75	Tolls by Mail $16.00

1. Inbound = To or entering Manhattan; Outbound = From or leaving Manhattan.

* Toll amounts are for vehicles with two axles and single rear wheels; higher rates apply to other vehicle classes. Discount plans are available for certain vehicles. For more information see https://new.mta.info/fares-and-tolls/bridges-and-tunnels/tolls-by-vehicle/cars and https://www.panynj.gov/bridges-tunnels/tolls.html.

For PANYNJ facilities, E-ZPass rates apply to E-ZPass accounts issued at the E-ZPass New York and New Jersey Customer Service Centers. For TBTA facilities, E-ZPass rates apply to E-ZPass accounts issued at the New York Customer Service Center (NYCSC). For E-ZPass accounts not issued at the NYCSC, customers pay the Tolls by Mail rate. The Mid-Tier toll rate applies to E-ZPass NYCSC customers when not using their properly mounted NYCSC E-ZPass tags, leading to charges being posted to their accounts based on their license plate.

Peak hours for PANYNJ crossings are weekdays 6:00 a.m. to 10:00 a.m. and 4:00 p.m. to 8:00 p.m. and weekends 11:00 a.m. to 9:00 p.m. TBTA does not vary its tolls by time of day.

From Brooklyn, motor vehicles can enter the Manhattan CBD using the Hugh L. Carey Tunnel beneath New York Harbor and the Brooklyn Bridge, Manhattan Bridge, and Williamsburg Bridge across the East River. From Queens, vehicles can use the Queens-Midtown Tunnel, which is the western terminus of the Long Island Expressway (I-495) and runs beneath the East River to connect with multiple streets between East 34th and East 41st Streets and Second and Third Avenues, or the Ed Koch Queensboro Bridge, which reaches Manhattan between East 59th and East 60th Streets at the Manhattan CBD boundary and connects to multiple streets between East 57th and East 62nd Streets. From New Jersey, vehicles can enter the Manhattan CBD using the Holland and Lincoln Tunnels beneath the Hudson River. Motorists from outside the Manhattan CBD can also enter via southbound roadways that enter the Manhattan CBD at 60th Street.

Motorists using the Hugh L. Carey Tunnel and Queens-Midtown Tunnel pay a toll to TBTA, which operates those tunnels and charges a toll in both directions. Motorists using the Holland and Lincoln Tunnels pay a toll to the PANYNJ, which operates those tunnels and charges a toll only in the inbound (to Manhattan) direction. Motorists using the four East River bridges, which are under the jurisdiction of NYCDOT, do not pay a toll.

Some vehicles enter the Manhattan CBD from the north using Manhattan's local street grid or the two highways on its periphery: the West Side Highway/Route 9A and Franklin D. Roosevelt (FDR) Drive. Those vehicles can enter Manhattan using untolled bridges over the Harlem River from the Bronx or one of three other TBTA and PANYNJ crossings: the Robert F. Kennedy Bridge from the Bronx and Queens, a TBTA facility

that is tolled in both directions; the Henry Hudson Bridge over the Harlem River from the Bronx, a TBTA facility that is tolled in both directions; and the George Washington Bridge over the Hudson River from New Jersey, a PANYNJ facility that is tolled in the inbound (to Manhattan) direction.[2]

Motorists must use the river crossings or the West Side Highway/Route 9A and the FDR Drive to access the region's interstate highways located outside the Manhattan CBD. From the Holland Tunnel, vehicles may connect to the New Jersey Turnpike Extension (I-78) and NJ Route 139 to US Routes 1 and 9. From the Lincoln Tunnel, vehicles may connect via NJ Route 495 to the New Jersey Turnpike (I-95) and NJ Routes 3 and 17. From the Hugh L. Carey Tunnel, vehicles may access the Gowanus Expressway (I-278) and Prospect Expressway (NY Route 27) in Brooklyn. The Williamsburg Bridge has direct access to the Brooklyn-Queens Expressway (I-278) in Brooklyn, and the Brooklyn and Manhattan Bridges have ramp connections to the Brooklyn-Queens Expressway near their Brooklyn landings. The Queens-Midtown Tunnel leads directly to the Long Island Expressway (I-495) in Queens. Motorists can access the interstate network north of the Manhattan CBD (I-80, I-87, I-95, and I-278, multiple parkways, and New York and New Jersey state highways) via the West Side Highway/Route 9A and Henry Hudson Parkway or the FDR Drive, either directly or using various connecting roadways. Some facilities such as the FDR Drive and certain parkways prohibit trucks and buses.

4.2 TRANSIT ACCESS TO THE MANHATTAN CBD

The New York metropolitan region has a robust transit network, much of it operating 24 hours per day/7 days per week/365 days per year, and the Manhattan CBD is the hub for much of it. People traveling to the Manhattan CBD can arrive by rail, subway, bus, tram, ferry, and paratransit (**Figure 4-3**).[3]

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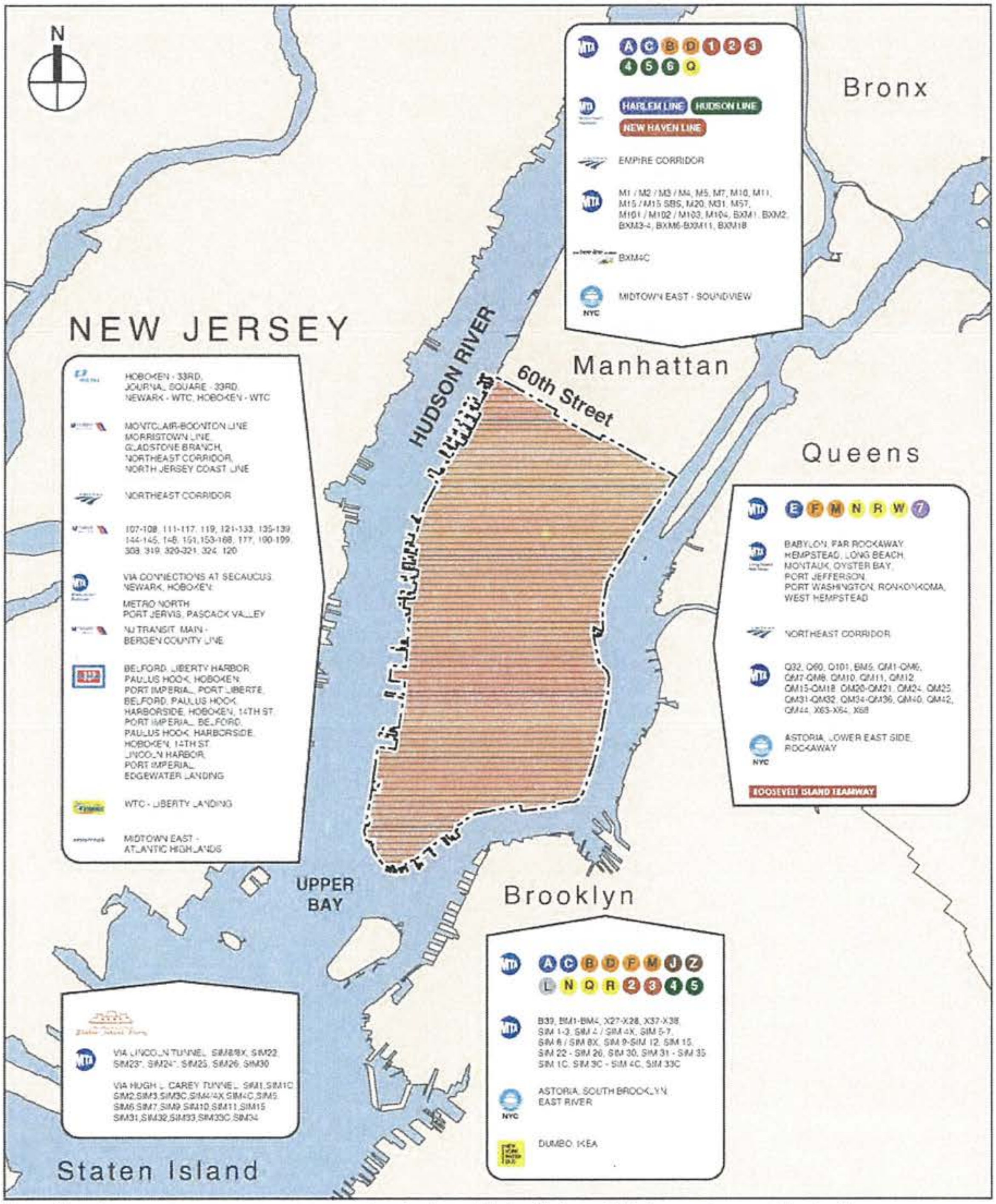
2 TBTA collects tolls at its facilities using open-road, cashless tolling. Tolls are charged to E-ZPass accounts for those who have E-ZPass tags. For vehicles without E-ZPass tags, customers may participate in the regional Tolls by Mail program through which license plate images are matched with information from the relevant Department of Motor Vehicles and a bill is sent to the registered vehicle owner. Motorists can also set up temporary, short-term accounts (for example, if they are planning to use a rental car in New York City). PANYNJ accepts E-ZPass at all of its bridges and tunnels, including the Holland and Lincoln Tunnels and the George Washington Bridge. The Holland Tunnel and the George Washington Bridge operate with cashless tolling. PANYNJ allow*[ed]* cash toll collection at the Lincoln Tunnel *[through December 11, 2022, when it transitioned]* to cashless tolling.

3 A limited number of people also arrive by helicopter at one of three heliports in Manhattan and by seaplane using the Midtown Skyport on the East River.

Figure 4-3. Transit Routes to/from the Manhattan Central Business District (2019)



Notes: Private bus operators connect commuters to various locations within the Manhattan CBD; those routes are not displayed here.
* Operated by Academy Bus

Manhattan CBD (Excluding West Side Highway/Route 9A and FDR Drive)

Transit by Sector

Source: WSP 2022

4.2.1 Subways

The New York City subway is the most widely used transit mode for access to the Manhattan CBD by residents of New York City.[4] It is the largest subway system in the United States, both in terms of miles of track and number of passengers served per year. The subway system comprises 25 routes serving 472 stations across the boroughs of the Bronx, Brooklyn, Manhattan, and Queens with 665 miles of track for transporting passengers (revenue track) with additional track to support operations (nonrevenue track). In 2019, the New York City subway had an average weekday ridership of about 5.5 million people and an annual ridership of 1.66 billion passengers. All but three of the 25 subway routes serve the Manhattan CBD, and the Manhattan CBD contains the system's 10 busiest stations.[5]

New York subway routes form an integrated network with free transfers between routes at many stations in the Manhattan CBD. For example, the Times Square subway station complex, which also includes stations on Sixth and Eighth Avenues, provides free connections between 16 subway routes (A, C, and E; N, Q, R, W, S, and Nos. 1, 2, 3, 7; and B, D, F, and M). The World Trade Center-Fulton Street Station complex in Lower Manhattan provides free transfers between 12 subway routes (E; N, R, and W; and A, C, J, Z, and Nos. 2, 3, 4, 5).[6] The subway also connects with regional transit hubs in the Manhattan CBD, allowing for connections from other modes. These include two stations with direct pedestrian connections to Penn Station New York and Moynihan Train Hall, a station complex beneath Grand Central Terminal, and a connection from the Times Square station complex via the 42nd Street-Port Authority Bus Terminal subway station to the Port Authority Bus Terminal.

In fall 2019, 2,228,000 people entered the Manhattan CBD by subway on an average weekday, which accounted for 58 percent of all people who entered the Manhattan CBD.[7]

4.2.2 Port Authority Trans-Hudson

Port Authority Trans-Hudson (PATH) is a rapid transit system serving Newark, Harrison, Hoboken, and Jersey City in New Jersey, as well as Lower and Midtown Manhattan in New York City. PANYNJ operates the PATH system, which comprises four routes and 13 stations (six in the Manhattan CBD and seven in New Jersey). PATH trains run from either Newark or Hoboken and into the Manhattan CBD with Manhattan termini at the World Trade Center and 33rd Street, just south of Penn Station New York. The system is just about 14 miles total in length. The PATH trains that terminate at West 33rd Street make intermediate stops within the Manhattan CBD. Trains that go to the World Trade Center make only that single stop in Manhattan. PATH train passengers can connect to the New York City subway at multiple PATH stations in

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4 The subway does not provide access to the Manhattan CBD from Staten Island.

5 Metropolitan Transportation Authority. "Subway and Bus Ridership for 2019." https://new.mta.info/agency/new-york-city-transit/subway-bus-ridership-2019.

6 The Cortlandt Street (No. 1 line) subway station is located within the World Trade Center site, but there is no fare-free connection between this station and the World Trade Center-Fulton Street station complex.

7 New York Metropolitan Transportation Council. January 2021. *Hub Bound Travel Data Report 2019*. https://www.nymtc.org/Portals/0/Pdf/Hub%20Bound/2019%20Hub%20Bound/DM_TDS_Hub_Bound_Travel_2019.pdf?ver=GS5smEoyHSsHsyX_t_Zriw%3d%3d.

Manhattan, but they must pay an additional fare. In fall 2019, an average of 273,447 people entered and exited the Manhattan CBD via the PATH train on average weekdays.[8]

4.2.3 Commuter Rail

New York City has the largest commuter rail network in the United States and includes MTA's Long Island Rail Road (LIRR) and Metro-North Railroad (Metro-North), as well as New Jersey Transit Corporation (NJ TRANSIT). Two commuter rail stations are in the Manhattan CBD—Grand Central Terminal and Penn Station New York. Metro-North serves Grand Central Terminal, while LIRR and NJ TRANSIT serve Penn Station New York. Projects are underway that will allow for some LIRR service at Grand Central Terminal and some Metro-North service at Penn Station New York.

LIRR operates between Manhattan and Long Island with station stops in Brooklyn and Queens in New York City and Nassau and Suffolk Counties on Long Island. With an average weekday ridership of 301,000 passengers across 735 trains, it is the busiest commuter railroad in North America. LIRR has 124 stations across 11 regularly operating branches and 319 miles of track in customer service. Most LIRR inbound trains terminate at Penn Station New York. Some LIRR trains terminate at Atlantic Terminal in Brooklyn or Hunters Point Terminal in Queens, where passengers can transfer to the subway and continue their trip to the Manhattan CBD. In addition to the Manhattan CBD, LIRR serves major commercial centers in Downtown Brooklyn and Nassau and Suffolk Counties. In fall 2019, an average of 246,843 people entered and exited the Manhattan CBD via LIRR on weekdays.[9]

Metro-North runs service between New York City and its northern suburbs in New York and Connecticut and provides local rail service within the New York City boroughs of Manhattan and the Bronx. Metro-North has five major branches (though some of the branches have multiple spurs) serving 124 stations within the regional study area. Two branches serve Rockland and Orange Counties, which are north of New York City and west of the Hudson River, and share tracks with NJ TRANSIT en route to their terminal in Hoboken, New Jersey. Three branches provide service between Grand Central Terminal and the Bronx, New York counties east of the Hudson River, and Connecticut. According to MTA, the system has an annual ridership of about 87 million people with close to 400 miles of track in customer service. In addition to serving the Manhattan CBD, Metro-North stops at large commercial districts in Yonkers, White Plains, and New Rochelle in New York as well as Stamford and New Haven, Connecticut. In fall 2019, an average of 226,296 people entered and exited the Manhattan CBD via Metro-North on average weekdays.[10]

NJ TRANSIT commuter rail connects 13 of the 14 New Jersey counties in the regional study area to the Manhattan CBD through its eight branches that serve the New York metropolitan region with close to 450 miles of track in customer service (excludes the Atlantic City branch). The eastern termini of NJ TRANSIT

8 New York Metropolitan Transportation Council. January 2021. *Hub Bound Travel Data Report 2019*. https://www.nymtc.org/Portals/0/Pdf/Hub%20Bound/2019%20Hub%20Bound/DM_TDS_Hub_Bound_Travel_2019.pdf?ver=GS5smEoyHSsHsyX_t_Zriw%3d%3d.

9 Ibid.

10 Ibid.

trains are Penn Station New York, Newark Penn Station, or the Hoboken Terminal. From Newark, passengers can transfer to a Penn Station New York-bound commuter rail train or can access PATH. From Hoboken, commuters can transfer to PATH or a ferry to complete the journey into the Manhattan CBD. In fall 2019, an average of 212,191 people entered and exited the Manhattan CBD via NJ TRANSIT commuter rail on average weekdays.[11]

4.2.4 Buses

New York City and the regional study area have an extensive network of buses. Commuter buses typically provide direct service between New York City neighborhoods or suburban communities and the Manhattan CBD and other employment centers in the region. Express or limited stop buses provide higher speed service on the more heavily patronized routes, and local buses operate throughout New York City and other counties in the regional study area. MTA has two subsidiaries—New York City Transit and MTA Bus—that operate bus service in New York City. NJ TRANSIT is the primary operator of commuter, express, and local buses in New Jersey, although some private bus operators provide both commuter and local bus services. Multiple public and private bus operators serve the suburban counties of New York and Connecticut.

MTA operates an extensive network of buses in New York City. Combined, New York City Transit and MTA Bus operate 234 local routes, 20 Select Bus Service routes (with payment prior to boarding to reduce dwell times at stops), and 73 commuter/express bus routes. The Manhattan CBD is well-served by buses. Express bus services available from Queens, Brooklyn, the Bronx, and Staten Island offer service to locations in Lower and Midtown Manhattan. The Manhattan CBD has multiple Select Bus Service routes (M14A, M14D, M15, and M23, M34, and M34A), which operate higher speed service with fewer stops than the local bus routes. Local bus routes (some of which have limited service with fewer stops) operate on most north–south avenues through the Manhattan CBD with continued service to Upper Manhattan. Crosstown local bus routes operate between the east and west sides of Manhattan on most two-way crosstown streets (e.g., Houston Street, 14th Street, 23rd Street, 34th Street, 42nd Street, and 57th Street). Crosstown service is available on pairs of one-way streets (e.g., St. Marks Place/Eighth Street and Ninth Street, 49th Street and 50th Street, and East 59th and East 60th Streets). Riders receive one free transfer between local, limited, and Select Bus Service routes and other local and Select Bus Service routes as well as the subway within two hours of the first swipe of a MetroCard. Customers may transfer to or from a commuter bus from a local bus, Select Bus Service bus, or subway, but they must pay the difference in the fare. Riders must pay for a transfer to an express service unless using an Unlimited Express Bus MetroCard.

The busiest bus route in all of New York City is the M15 local/M15 Select Bus Service, which operates along First and Second Avenues in Manhattan from the South Ferry Terminal in Lower Manhattan to 126th Street in the East Harlem neighborhood of Upper Manhattan.

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11 New York Metropolitan Transportation Council. January 2021. *Hub Bound Travel Data Report 2019.* https://www.nymtc.org/Portals/0/Pdf/Hub%20Bound/2019%20Hub%20Bound/DM_TDS_Hub_Bound_Travel_2019.pdf?ver=GS5smEoyHSsHsyX_t_Zriw%3d%3d.

New York City in cooperation with MTA, has included an extensive bus lane network throughout Manhattan and other boroughs to increase bus operating speeds and provide a degree of priority to buses over general traffic lanes.

NJ TRANSIT buses and private bus companies serve New Jersey counties in the regional study area. NJ TRANSIT operates an extensive network of commuter and local bus routes. Many commuter buses provide one-seat ride service between cities and towns in New Jersey and the Port Authority Bus Terminal in the Manhattan CBD, meaning travelers do not need to transfer between buses or from buses to trains to get to the Manhattan CBD. More than 65 NJ TRANSIT bus routes operate between New Jersey and the Port Authority Bus Terminal (PABT). While not every town in New Jersey has one-seat ride service to the Manhattan CBD, NJ TRANSIT provides bus service to all 14 New Jersey counties in the regional study area. Other private bus operators (e.g., Academy Bus Lines, Coach USA, and Trans-Bridge Bus Lines) operate between New Jersey communities within the regional study area (including park-and-ride lots), and either the PABT or curbside stops within the Manhattan CBD.

Limited bus connections are available from Long Island, New York counties north of New York City, and Connecticut to the Manhattan CBD. The Westchester County Department of Transportation's Bee-Line operates an express bus route to the Manhattan CBD from Westchester County. Coach USA operates commuter buses between towns in Rockland and Orange Counties, New York, and the PABT. Hampton Jitney is a private bus service between towns in eastern Long Island (Suffolk County, New York) and the Manhattan CBD. Other private bus operators offer limited operations between communities within the regional study area and either the PABT or curbside stops within the Manhattan CBD.

In the fall 2019, an average of 276,000 people entered and exited the Manhattan CBD by bus on average weekdays.[12]

4.2.5 Ferries

The following ferry operators, both privately owned and publicly owned, provide service to the Manhattan CBD from the other boroughs of New York City and waterfront communities in New Jersey:

- The New York City Economic Development Corporation owns NYC Ferry. The NYC Ferry service is a network of six ferry routes (with a seventh planned) that connects certain waterfront neighborhoods in the Bronx, Queens, Brooklyn, and Staten Island with various piers in the Manhattan CBD, including Wall Street, East 34th Street, and Midtown West at West 37th Street/Pier 79. There are also stops at Stuyvesant Cove (East River at East 20th Street) and Corlears Hook (East River at Jackson Street) within the Manhattan CBD, but only one ferry route serves each of these stops.

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12 New York Metropolitan Transportation Council. January 2021. *Hub Bound Travel Data Report 2019.* https://www.nymtc.org/Portals/0/Pdf/Hub%20Bound/2019%20Hub%20Bound/DM_TDS_Hub_Bound_Travel_2019.pdf?ver=GS5smEoyHSsHsyX_t_Zriw%3d%3d.

- NYCDOT operates the Staten Island Ferry between the South Ferry Terminal in Lower Manhattan and the St. George Ferry Terminal in Staten Island.
- New York Waterway is a privately operated ferry system that operates service on multiple routes across the Hudson River between eight piers in Bergen and Hudson Counties in New Jersey and four piers in Midtown and Lower Manhattan.
- Seastreak is a privately owned ferry service that operates between East 34th Street and the Battery Maritime Building piers on the East River in the Manhattan CBD and either Atlantic Highlands or Sandy Hook Beach in Monmouth County, New Jersey.

In the fall 2019, an average of 118,525 people entered and exited the Manhattan CBD via ferry service on average weekdays.[13]

4.2.6 Tram

The Roosevelt Island tram connects Roosevelt Island (an island in the East River between Queens and Manhattan) with Manhattan. The Manhattan terminus is located on Second Avenue between East 59th and East 60th Streets. The entire trip takes about 3 minutes, and the system transports more than 2 million passengers annually. The F subway line also provides service between Roosevelt Island and Manhattan.

4.3 BICYCLE AND PEDESTRIAN ACCESS TO THE MANHATTAN CBD

People may reach the Manhattan CBD on foot or by bicycle. The north–south avenues that cross 60th Street have sidewalks, and bicycle lanes are available on Amsterdam Avenue, Columbus Avenue, Central Park West, Second Avenue, and First Avenue. Shared-use bicycle and pedestrian paths are also along the Hudson and East Rivers. From Brooklyn and Queens, people may cross the Ed Koch Queensboro, Williamsburg, Manhattan, and Brooklyn Bridges by bicycle or on foot. There is no direct bicycle or pedestrian access between New Jersey and the Manhattan CBD as pedestrians are prohibited from the tunnel crossings.[14]

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13 New York Metropolitan Transportation Council. January 2021. *Hub Bound Travel Data Report 2019.* https://www.nymtc.org/Portals/0/Pdf/Hub%20Bound/2019%20Hub%20Bound/DM_TDS_Hub_Bound_Travel_2019.pdf?ver=GS5smEoyHSsHsyX_t_Zriw%3d%3d.

14 Pedestrians and bicyclists are permitted to cross the George Washington Bridge and can reach the Manhattan CBD using the Hudson River Greenway or one of Manhattan's north–south avenues.

4A. Regional Transportation Effects and Modeling

4A.1 OVERVIEW AND CONTEXT

This subchapter describes the reasonably expected effects of implementing the CBD Tolling Alternative on the regional transport system, including travel demand and mode choice. It provides a description of the Best Practice Model (BPM)—the travel demand forecasting model that the New York Metropolitan Transportation Council (NYMTC) developed and maintains—and explains how the model was used to forecast the reasonably expected effects of the Project. The model results show changes in the region's travel characteristics, and specifically how trips would be made to, from, through, and around the Manhattan CBD, including any changes in the total number of trips, routes, and mode choice. The analysis of traffic impacts and mitigation, effects on transit usage, parking, pedestrians, and bicycle usage are based on outputs from these BPM forecasts, and they are evaluated in detail in other subchapters of **Chapter 4, "Transportation."**

4A.2 METHODOLOGY

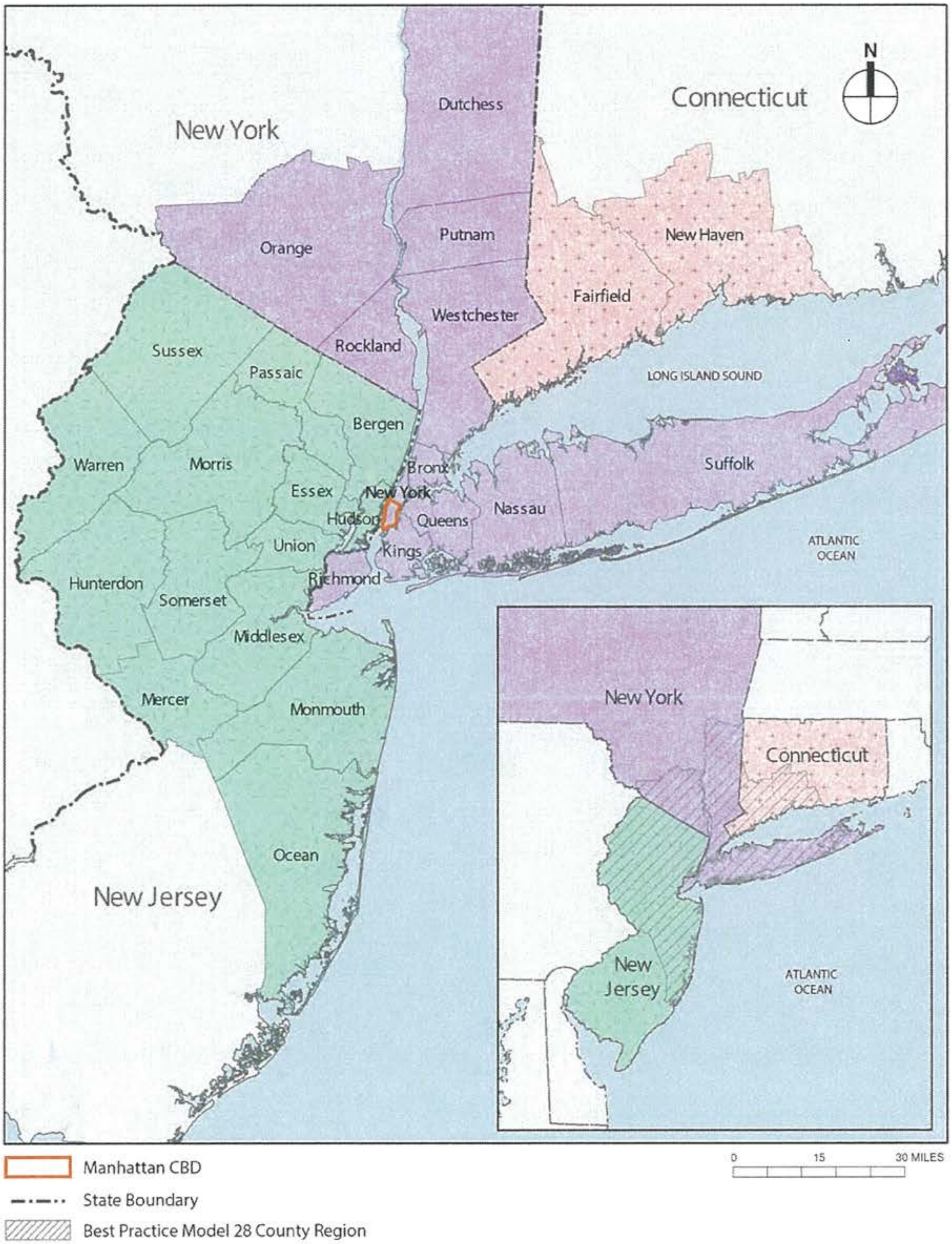
This analysis is based on a compilation of existing travel characteristics and forecasts of changes in travel demand using the BPM, which is the primary tool used to analyze the effects of large-scale regional transportation projects including, the New York metropolitan area's Federally recognized Regional Transportation Plan, PANYNJ Bus Terminal Redesign, and New NY Bridge Project. The model has been adopted by NYMTC's member agencies for use in regional transportation planning analyses, and it is the Federally recognized transportation forecasting tool for the region. Transportation findings from the BPM were augmented with information from academic studies and observed changes from similar cordon tolling programs in London, England, and Stockholm, Sweden.[1]

4A.2.1 Overview of Best Practice Model

The NYMTC version of the BPM used for this study was developed for NYMTC's 2017 Regional Transportation Plan and Federal air quality conformity determination. It includes the 28 counties that this EA uses for the study area (**Figure 4A-1**). NYMTC regularly updates and calibrates the BPM as part of its regional transportation planning responsibilities, including updating the model's demographic data, future employment and population projections, and changes in the underlying transportation network.

1 London and Stockholm were chosen as comparative cities based on the scale and scope of their congestion charging programs. Congestion charging programs in these cities offer the most similarities to the proposed CBD Tolling Program. Additional cities in Europe and Asia (e.g., Milan [Italy] and Singapore) have congestion charging programs, but the programs in these cities differ in substantive ways from the proposed CBD Tolling Program. For example, the Milan program bans late-model high-pollution vehicles from the charging zone altogether. Social context is also important for comparative analysis where differing government and social norms may result in contrasting outcomes from a congestion charge.

Figure 4A-1. The Best Practice Model 28-County Region



Source: ESRI, NYC Open Data, NYMTC 2020 TransCAD Highway Network
Note: The shades of purple, green, and pink reinforce the county boundaries for New York, New Jersey, and Connecticut, respectively.

The BPM includes roadway and transit networks and land use data (observed and forecast) for 2010,[2] 2017, 2020, and 2045. For the Project, NYMTC's 2020 BPM roadway and transit networks and land use data were used as the basis to forecast the effects of the CBD Tolling Alternative in the opening year (2023) because it provides the most recent pre-COVID-19-pandemic data, including but not limited to 2019 traffic counts. In addition, as described in **Chapter 1, "Introduction,"** pre-COVID-19-pandemic baseline conditions are considered the appropriate way to define near-term 2023 No Action Alternative conditions as the region rebounds and to forecast to 2045, a horizon year that reflects a long-term condition not biased by periodic disruptions.[3, 4] The roadway networks from NYMTC were updated to include projects that have been implemented or constructed but were not included in the original BPM roadway networks from NYMTC (e.g., two-way tolling on the Verrazzano-Narrows Bridge, reduced lane capacity on the Brooklyn-Queens Expressway near Brooklyn Heights, and bike lane projects like the Brooklyn Bridge bike lane) in the opening (2023) and horizon (2045) years.

The BPM is an activity-based model that simulates the number and types of journeys[5] made on an average weekday in the region by each resident. The BPM does not model or forecast weekend travel or other atypical days such as Gridlock Alert days.[6] This creates a realistic analysis that is based on the various decisions (e.g., mode, purpose, destination, frequency, location of intermediate stops, and time of day) made by travelers between these locations informed by employment and demographic data from NYMTC. The BPM generates over 28.8 million journeys per average weekday from the 28-county region's 8.2 million households.

For vehicular modes, the BPM roadway networks contain more than 61,000 links that include local streets, interstates, and freeways, and more than 4,600 Traffic Analysis Zones (TAZs).[7] For each roadway link, the BPM roadway networks contain information on the number of lanes, functional class,[8] speed, truck usage, and toll collection. The opening year and horizon year roadway and transit networks are used to estimate travel times and distances between all parts of the region—from each TAZ to every other TAZ. The roadway and transit networks are also used to assign travel demand flows to roadways and transit routes to produce roadway volumes, speeds, and transit boardings and alightings. Roadway volumes can be reported by the following vehicle classes:

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2 This version of the BPM is calibrated to 2010 conditions because the regional household travel survey upon which the BPM is based was conducted in 2010.

3 The 2023 and 2045 transportation networks for the No Action Alternative include the planned improvements documented in the Regional Transportation Plan, adopted in June 2017. Source: New York Metropolitan Transportation Council. June 2017. *Plan 2045: Maintaining the Vision for a Sustainable Region.*

4 The horizon year is typically defined as the year for which a transportation plan describes the envisioned transportation system. This is typically the last year of a metropolitan region's 20-year regional transportation plan. The last year analyzed in the New York Metropolitan Transportation Council's adopted 2017 Regional Transportation Plan is 2045.

5 A journey is defined as round-trip travel between principal locations like home and anchor locations such as work, school, retail, or entertainment. The BPM also estimates related trips linked to the anchor travel location (e.g., intermediate stops such as a day care center or gym).

6 Most regional travel demand models in the United States forecast only average weekday travel behavior. In the New York region, weekend travel is less than weekday travel. To derive annual estimates of travel and air quality metrics, annualization factors derived from observed data are used to extrapolate average weekday trends to average annual trends.

7 TAZs are approximately the size of U.S. Census Block Groups in the BPM. TAZs are used to aggregate travel origins and destinations to computationally manageable sizes for roadway and transit assignment procedures.

8 Functional classification describes roadway design, including its speed, capacity, and relationship to existing and future land use development.

- Single-occupancy vehicles[9, 10]
- High-occupancy vehicles (HOV) (of a minimum of two or more occupants)
- Taxis (including FHVs)[11]
- Medium trucks, heavy trucks, and commercial vans
- Buses[12]

For transit modes, the BPM contains all the routes, stations/stops, service frequencies, and fares for transit service throughout the metropolitan region, including the following:

- MTA subway, bus, and commuter rail
- NJ Transit Corporation (NJ TRANSIT) commuter rail, light rail, and bus
- Port Authority Trans-Hudson (PATH) rail service
- Ferries
- Other public buses such as the Westchester Bee-Line and Nassau Inter-County Express
- Private transit bus operators[13]

The model also generates an estimate of travel demand based on how people travel to their destination and from their origin (walk,[14] drive) or any transfers between routes for commuter rail, subway, light rail, bus, ferry, and tramway.

4A.2.2 Modeling of Toll Rates

Because the actual tolls will be determined through a process subsequent to the completion of this EA, the BPM modeling for this effort makes use of seven tolling scenarios within the CBD Tolling Alternative, each with a different set of variable toll rates and different exemptions, discounts, and/or crossing credits. Tolls are an explicit model input. Through this set of tolling scenarios, the modeling captures the full range of potential effects from the Project (see **Table 2-3 and Table 2-5** in **Chapter 2, "Project Alternatives,"** for a description of the tolling scenarios evaluated).[15] In addition, the BPM represents the cost sensitivity of

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9 Occupancy in this context refers to the number of people in the vehicle during the trip. It is not a reference to the occupant capacity of the vehicle.

10 In the BPM, motorcycles are considered personal vehicles, and they are included in the model's representation of single- and high-occupancy vehicles along with cars, trucks, sport-utility vehicles, and other personal vehicles. Motorcycles comprise less than 0.5 percent of overall traffic entering the Manhattan CBD at TBTA facilities.

11 FHVs provide pre-arranged transportation. There are four classes of FHV services: Community Cars (Liveries), Black Cars, Luxury Limousines, and High Volume For-Hire Services. Prominent examples of High Volume For-Hire Services include Lyft, Uber, and Via.

12 Bus volumes in the BPM reflect the estimated number of transit buses on a roadway link based on transit operating schedules.

13 The BPM includes private bus operators (not jitneys) that provide contracted transit services to a public transit agency, for example, Suburban Transit service on behalf of NJ TRANSIT in Middlesex County. The BPM also includes private, regular commuter services to Manhattan like commuter express services from New Jersey, Long Island, and the New York counties north of New York City (e.g., Academy, Lakeland, Coach USA).

14 Walk includes all nonmotorized access to the transit system including bicycles.

15 As described in **Chapter 2, "Project Alternatives,"** this Environmental Assessment (EA) evaluates multiple tolling scenarios to identify the range of potential effects that would occur from implementing the Project. These tolling scenarios have a range of different toll amounts and toll structures, such as crossing credits, discounts, and/or exemptions. Ultimately, the TBTA Board will determine the toll amounts and toll structure to be implemented.

various travelers in response to tolling. The assumptions that drive these sensitivities are described in **Appendix 4A.1, "Transportation: Section 4A.1-7. Value of Time."**

4A.3 EVALUATING THE PROJECT

Results from the BPM for the No Action Alternative and the seven tolling scenarios were used to evaluate the effects of the CBD Tolling Alternative. This subchapter focuses on key findings from the BPM analysis and regional changes in travel behavior across the 28 counties included in the BPM (see **Figure 4A-1**). More detailed results on local roads, highways, local intersections, transit, bicycles, pedestrians, and parking are described and discussed in **Subchapter 4B through Subchapter 4E** across the 28-county region.

A detailed summary of the BPM outputs for the No Action Alternative and CBD Tolling Alternative (including the tolling scenarios) is provided in **Appendix 4A.2, "Transportation: Travel Forecast Tolling Scenario Summaries and Detailed Tables,"**. In all tables presented here, unless noted, the term "vehicle" in this chapter refers to all on-road vehicles, including single-occupancy vehicles, HOVs, motorcycles, taxis, FHVs,[16] buses, and trucks.

Three metrics were used to summarize and compare the forecasts of the No Action Alternative and the CBD Tolling Alternative in this subchapter:

1. **Daily Vehicles Entering the Manhattan CBD:** This metric conveys the change in the number of vehicles that would cross into the Manhattan CBD as a result of the different tolling scenarios, and how those changes would vary geographically. **Table 4A-1**, **Table 4A-4**, **Table 4A-5**, **Table 4A-11**, and **Table 4A-12** report the number of vehicle crossings into the Manhattan CBD as described below:
   - New Jersey Crossings: Lincoln and Holland Tunnels
   - Brooklyn Crossings: Williamsburg, Manhattan, and Brooklyn Bridges and the Hugh L. Carey Tunnel
   - Queens Crossings: Ed Koch Queensboro Bridge[17] and Queens-Midtown Tunnel
   - 60th Street Crossings in Manhattan (divided into three groupings):
     - East Side avenues
     - West Side avenues
     - Franklin D. Roosevelt (FDR) Drive and the West Side Highway/Route 9A (combined volumes)[18]

[16] Since the BPM does not distinguish between taxis and FHVs, taxi and FHV maximum CBD toll rates were blended to evaluate policy differences in tolling. **Appendix 4A.1, "Transportation: Implementation of Tolls in the Best Practice Model,"** provides a more detailed discussion of modeling taxi and FHV travel.

[17] The Manhattan-bound upper ramp of the Queensboro Bridge is considered part of the Queens-inbound crossing locations to the Manhattan CBD, and it is also reported in the 60th Street outbound crossing locations. Currently, all Manhattan-bound traffic enters the bridge via the northern upper-level lanes of the Ed Koch Queensboro Bridge and enters the Manhattan CBD but immediately exits the Manhattan CBD on the northbound ramp to 62nd Street (except for AM peak-period HOV lanes that use the southern lanes, typically reserved for outbound traffic, which enter the Manhattan CBD at 59th Street). The Queensboro Bridge entrances and exits are consistent with the NYMTC *Hub Bound Travel Data Report*. All traffic using the northern upper roadway of the Ed Koch Queensboro Bridge to access Manhattan north of 60th Street would not be subject to CBD tolling in the tolling scenarios modeled in this EA.

[18] Vehicles traveling south of 60th Street on the West Side Highway/Route 9A and the FDR Drive would not be charged a CBD toll if they remain on these roadways and do not enter the Manhattan CBD.

2. **Daily VMT:** The analysis conveys the change in the aggregate level of driving or traffic that would occur within the BPM's modeled area. **Table 4A-2, Table 4A-6, Table 4A-7, Table 4A-13, and Table 4A-14** report the quantity of VMT (i.e., total miles traveled by vehicles) forecast in each reporting area. Changes in VMT are correlated with changes in level of service, air quality, and noise discussed in **Subchapter 4B, "Highways and Local Intersections," Chapter 10, "Air Quality," and Chapter 12, "Noise."**

   Figure 4A-2 displays the reporting subareas used within New York City (NYC Subareas 1, 2, and 3). The subareas are defined based on their proximity to the Manhattan CBD entry and exit locations. The Manhattan CBD comprises the surface streets within the CBD, referred to below as the CBD Core and the highways that circumnavigate the surface streets, referred to as the Peripheral Highways. The Peripheral Highways include:

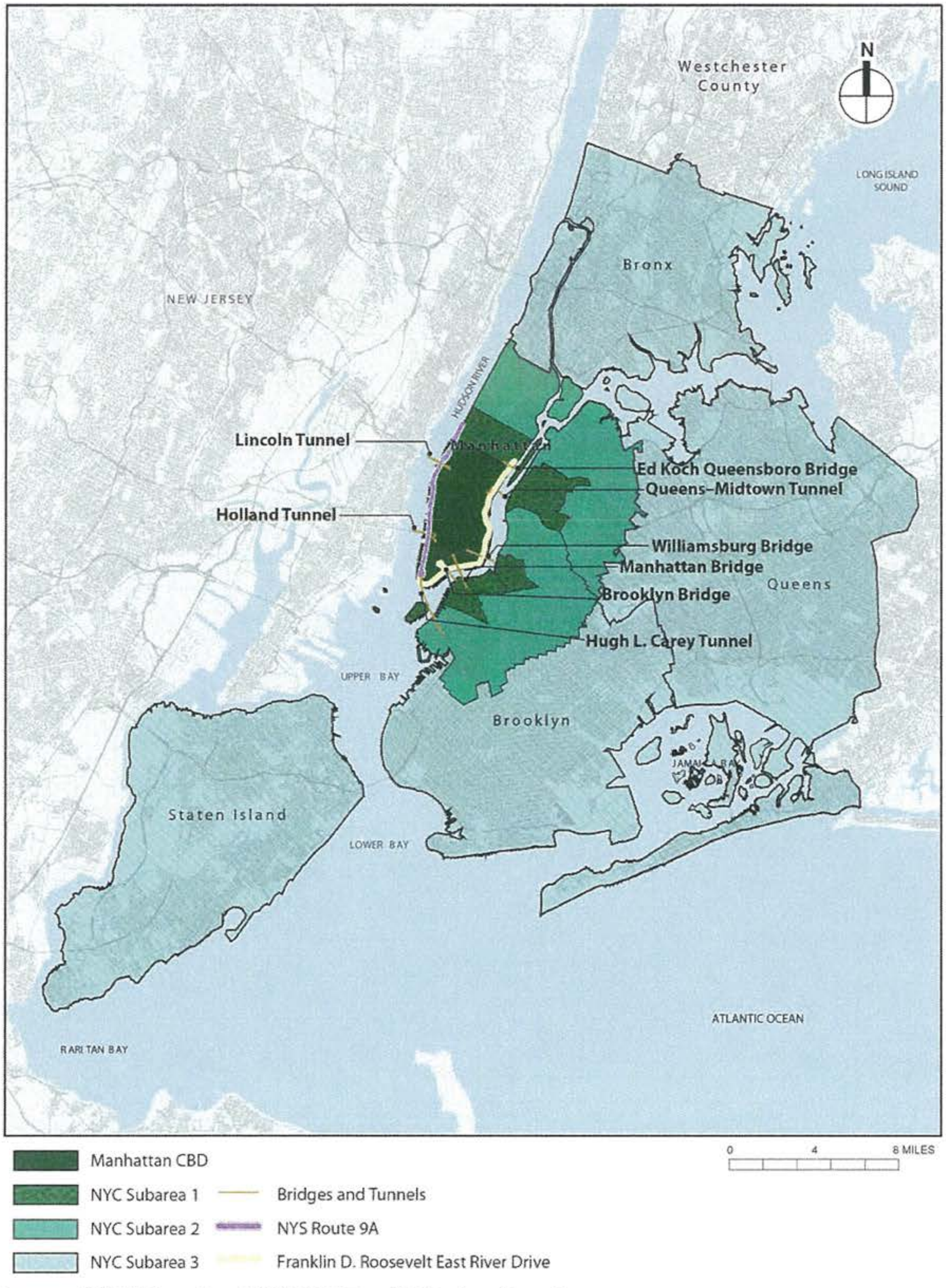
   – West Side Highway/Route 9A south of 60th Street
   – FDR Drive south of 60th Street, including the Battery Park Underpass
   – Lincoln, Holland, Hugh L. Carey, and Queens-Midtown Tunnels
   – Brooklyn, Manhattan, Williamsburg, and Ed Koch Queensboro Bridges

   Outside New York City, VMT is reported for the remaining seven New York counties that are inside the BPM boundary: Nassau County and Suffolk County on Long Island and five counties to the north of New York City (Dutchess, Orange, Putnam, Rockland, and Westchester). In Connecticut, VMT is reported for Fairfield and New Haven Counties. In New Jersey, VMT is reported for the 14 northeastern counties. (See **Figure 4A-1** for a map of the 28 counties in the BPM.)

3. **Mode Shares for Manhattan CBD-Related Person-Journeys.** The analysis conveys the share of journeys that would be made by transit, auto, and nonmotorized (walk and bike) travel modes related to the Manhattan CBD. Manhattan CBD-related journeys are those with one or both ends of the journey inside the Manhattan CBD. These metrics are reported in **Table 4A-3, Table 4A-8, and Table 4A-15**.

   Table 4A-8 and Table 4A-15 report changes in the percentage share of transit***[, auto, and nonmotorized]*** journeys that would originate outside and travel into the Manhattan CBD; journeys that would originate inside and travel out of the Manhattan CBD; and journeys that would be completely internal to the Manhattan CBD. Transit share reported is the number of people who would make a transit journey—including via subway, commuter rail, buses, ferries, and trams—as a percentage of people who would travel by all motorized vehicles and nonmotorized modes such as walking and biking.

Figure 4A-2. Reporting Locations in New York City for Additional Vehicle-Miles Traveled



Source: ESRI, NYC Open Data, NYMTC 2020 TransCAD Roadway Network

4A.4 ENVIRONMENTAL CONSEQUENCES

4A.4.1 No Action Alternative

This section presents the predicted changes in regional travel patterns between the opening year (2023) and the horizon year (2045) for the No Action Alternative. The 2023 and 2045 transportation networks for the No Action Alternative include the planned improvements documented in the Regional Transportation Plan, adopted in June 2017.[19] Additional network updates (described in **Appendix 4A.1, "Transportation: Implementation of Tolls in the Best Practice Model," Table 4A.1-3**) were implemented to reflect existing conditions as of September 2021.[20] Land use, population, and employment assumptions come from the NYMTC Socioeconomic and Demographic Forecasts. NYMTC routinely develops these forecasts for the region, which include population, households, employment, and labor force projections.

With these assumptions, BPM-generated forecasts show a 4.8 percent increase (about 0.25 percent per year) in daily vehicles entering the Manhattan CBD (**Table 4A-1**) between 2023 and 2045. The largest absolute increase would occur on the 60th Street crossings, with an additional 12,410 vehicle trips.

Table 4A-1. Forecast Growth in Daily Vehicles Entering the Manhattan CBD: No Action Alternative

CROSSING LOCATIONS	OPENING YEAR (2023)	HORI ON YEAR (2045)	DIFFERENCE	PERCENTAGE CHANGE
60th Street	276,466	288,876	12,410	4.5
FDR Drive and West Side Highway/Route 9A[1]	161,696	168,499	6,803	4.2%
West Side Avenues	28,026	31,920	3,894	13.9%
East Side Avenues[2]	86,744	88,457	1,713	2.0%
Queens	142,596	154,348	11,752	8.2
Brooklyn	187,486	192,604	5,118	2.7
New Jersey	109,602	114,867	5,265	4.8
TOTAL	716,150	750,695	34,545	4.8

1 Vehicle volumes entering the Manhattan CBD reported in this table for the FDR Drive and the West Side Highway/Route 9A and are all vehicles traveling south on these facilities at 60th Street regardless of whether the vehicle eventually enters the Manhattan CBD from one of these facilities. Some vehicles reported in this table may use the FDR Drive and the West Side Highway/Route 9A to access the Hugh L. Carey Tunnel or Brooklyn Bridge without ever entering the Manhattan CBD. The volumes here are reported in this manner to be consistent with counts published in the annual NYMTC *Hub Bound Travel Data Report*.

2 The larger volumes in East Side avenues result from some Queensboro Bridge traffic being counted twice. The NYMTC *Hub Bound Travel Data Report* cordon includes the upper inbound roadway as a Manhattan CBD outbound tolling zone boundary. Any traffic that would then circle back into the Manhattan CBD via Second Avenue or York Avenue would be recounted as a Manhattan CBD inbound trip.

19 New York Metropolitan Transportation Council. June 2017. *Plan 2045: Maintaining the Vision for a Sustainable Region.*

20 Modeling of tolling scenarios commenced on September 2021; therefore, any road network changes since then are not included in this analysis.

Table 4A-2 summarizes the changes in forecast daily VMT for all vehicles under the No Action Alternative. In the No Action Alternative, VMT is forecast to grow by 8.8 percent regionwide between 2023 and 2045. In the Manhattan CBD, VMT is forecast to grow by 4.9 percent. The largest increases in VMT would be on Long Island and in the five New York counties north of New York City. For the New Jersey counties in the model area, VMT would increase by 10.6 percent (an increase of more than 10 million VMT on an average weekday). For the 12 New York State counties in the model area, VMT would increase by nearly 12 million VMT (9.8 percent). New York City's subareas are expected to see increases in daily VMT in the range of 5.3 percent to 7.2 percent.

In 2045, the No Action Alternative would have a 1.2 percent increase in Manhattan CBD-related transit mode share—from 61.7 percent to 62.9 percent transit share. This growth would be driven primarily by journeys that begin outside the Manhattan CBD (**Table 4A-3**).

4A.4.2 2023 CBD Tolling Alternative

Travel forecasts were prepared for the opening year (2023) and horizon year (2045) for the CBD Tolling Alternative for each of the seven tolling scenarios (see **Chapter 2, "Project Alternatives,"** for more information on the tolling scenarios). The results of these forecasts were compared with the No Action Alternative to assess the effects of each tolling scenario. **Appendix 4A.2, "Transportation: Travel Forecast Tolling Scenario Summaries and Detailed Tables,"** provides detailed statistics for each of the forecasts. This section summarizes key metrics for 2023.

Table 4A-4 and Table 4A-5 show the change in vehicles that would enter or pass through the Manhattan CBD. Absolute volumes and percentage change compared to the No Action Alternative are shown. The larger reductions on the East Side avenues compared to the West Side avenues are a result of changing volumes on the upper level of the Ed Koch Queensboro Bridge. Tolling Scenarios C through F all offer some form of crossing credits for the Queens-Midtown Tunnel. The crossing credits increase the attractiveness of the TBTA East River facilities compared to the Ed Koch Queensboro Bridge and divert crossings destined for the Manhattan CBD off the bridge and onto TBTA facilities. With fewer Manhattan CBD-bound vehicles using the upper level of the bridge, traffic would be reduced on the East Side avenues into the Manhattan CBD at greater levels than the West Side avenues.

Table 4A-2. Forecast Growth in All Vehicle Daily Vehicle-Miles Traveled: No Action Alternative

LOCATION	OPENING YEAR (2023)	HORI ON YEAR (2045)	GROWTH FROM 2023 TO 2045	PERCENTAGE CHANGE
New York Counties	122,186,497	134,186,361	11,999,864	9.8
New York City	47,131,752	49,748,914	2,617,162	5.6%
Manhattan CBD	3,244,791	3,402,711	157,920	4.9%
CBD Core	1,217,727	1,262,019	44,292	3.6%
Peripheral Highways (south of 60th Street; excluded from the toll)	2,027,064	2,140,692	113,628	5.6%
West Side Highway/Route 9A	610,657	647,671	37,014	6.1%
FDR Drive	720,682	758,659	37,977	5.3%
Bridges and Tunnels	695,725	734,362	38,637	5.6%
NYC Subarea 1 (see Figure 4A-2)	2,218,077	2,349,929	131,852	5.9%
NYC Subarea 2 (see Figure 4A-2)	6,660,953	7,142,863	481,910	7.2%
NYC Subarea 3 (see Figure 4A-2)	35,007,931	36,853,411	1,845,480	5.3%
Long Island Counties (2)	41,585,545	46,813,526	5,227,981	12.6
New York Counties North of New York City (5)	33,469,200	37,623,921	4,154,721	12.4
New Jersey Counties (14)	97,578,100	107,907,842	10,329,742	10.6
Connecticut Counties (2)	34,909,870	35,063,470	153,600	0.4
TOTAL	254,674,467	277,157,673	22,483,206	8.8

Note: The number of counties are indicated within parentheses ( ).

* Bridge and tunnel traffic includes VMT from the portion of bridges and tunnels in New York County (Manhattan) entering the Manhattan CBD from Kings County (Brooklyn), Queens, and New Jersey.

Table 4A-3. Changes in Manhattan CBD Total Daily Mode Share: No Action Alternative

DIRECTION OF JOURNEY	OPENING YEAR (2023)	HORI ON YEAR (2045)	PERCENTAGE POINT CHANGE
Journeys Beginning Outside the Manhattan CBD	1,920,016	2,056,665	
Auto (including HOV, Taxi, FHV)	19.1%	17.7%	-1.4%
Transit	78.2%	79.7%	1.5%
Walk and Bike	2.7%	2.6%	-0.1%
Journeys Beginning Inside the Manhattan CBD	159,183	173,345	
Auto (including HOV, Taxi, FHV)	30.2%	29.7%	-0.5%
Transit	51.5%	52.1%	0.6%
Walk and Bike	18.3%	18.2%	-0.1%
Journeys Within the Manhattan CBD	875,418	916,741	
Auto (including HOV, Taxi, FHV)	7.1%	6.9%	-0.2%
Transit	27.5%	27.4%	-0.1%
Walk and Bike	65.4%	65.7%	0.3%
All Manhattan CBD-Related Journeys	2,954,617	3,146,751	
Auto (including HOV, Taxi, FHV)	16.2%	15.3%	-0.9%
Transit	61.7%	62.9%	1.2%
Walk and Bike	22.1%	21.8%	-0.3%

Note: Trucks are excluded from mode share calculations

Table 4A-4. Daily Vehicles[1] Entering the Manhattan CBD by Crossing Location: No Action Alternative and Tolling Scenarios (2023)

CROSSING LOCATION	NO ACTION	SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
60th Street	276,466	220,659	221,318	208,405	198,437	196,294	204,011	216,999
FDR Drive and West Side Highway/Route 9A[2]	161,696	151,594	152,322	146,846	141,979	140,589	144,802	150,734
West Side Avenues	28,026	22,265	22,743	20,793	19,710	19,467	20,410	22,105
East Side Avenues	86,744	46,800	46,253	40,766	36,748	36,238	38,799	44,160
Queens	142,596	125,030	124,315	130,029	136,799	136,652	137,229	123,298
Brooklyn	187,486	168,154	167,624	152,790	138,880	137,092	137,368	165,509
New Jersey	109,602	92,070	90,704	100,791	107,810	103,257	106,560	88,196
TOTAL	716,150	605,913	603,961	592,015	581,926	573,295	585,168	594,002

1 Unless noted, the term "vehicles" in this subchapter refers to all on-road vehicles, including single-occupancy vehicles, HOVs, motorcycles, taxis, FHVs, buses, and trucks.

2 In this table, vehicle volumes reported as entering the Manhattan CBD on the FDR Drive and the West Side Highway/Route 9A are all vehicles traveling south on these facilities at 60th Street regardless of whether the vehicle eventually enters the Manhattan CBD from one of these facilities. Some vehicles reported in this table may use the West Side Highway/Route 9A and the FDR Drive to access the Hugh L. Carey Tunnel or Brooklyn Bridge without ever entering the Manhattan CBD. These volumes are reported in this manner to be consistent with how vehicle count data is published in the annual NYMTC *Hub Bound Travel Data Report*.

Table 4A-5. Percentage Change (compared to No Action Alternative) in Daily Vehicles Entering the Manhattan CBD by Crossing Location and Tolling Scenario (2023)

CROSSING LOCATIONS	SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
60th Street	-20.2	-19.9	-24.6	-28.2	-29.0	-26.2	-21.5
FDR Drive and West Side Highway/Route 9A	-6.2%	-5.8%	-9.2%	-12.2%	-13.1%	-10.4%	-6.8%
West Side Avenues	-20.6%	-18.9%	-25.8%	-29.7%	-30.5%	-27.2%	-21.1%
East Side Avenues	-46.0%	-46.7%	-53.0%	-57.6%	-58.2%	-55.3%	-49.1%
Queens	-12.3	-12.8	-8.8	-4.1	-4.2	-3.8	-13.5
Brooklyn	-10.3	-10.6	-18.5	-25.9	-26.9	-26.7	-11.7
New Jersey	-16.0	-17.2	-8.0	-1.6	-5.8	-2.8	-19.5
TOTAL	-15.4	-15.7	-17.3	-18.7	-19.9	-18.3	-17.1

* In this table, vehicle volumes reported as entering the Manhattan CBD on the FDR Drive and the West Side Highway/Route 9A are all vehicles traveling south on these facilities at 60th Street regardless of whether the vehicle eventually enters the Manhattan CBD from one of these facilities. Some vehicles reported in this table may use the West Side Highway/Route 9A and the FDR Drive to access the Hugh L. Carey Tunnel or Brooklyn Bridge without ever entering the Manhattan CBD. These volumes are reported in this manner to be consistent with how vehicle count data is published in the annual NYMTC *Hub Bound Travel Data Report*.

While all the tolling scenarios within the CBD Tolling Alternative would reduce traffic entering the Manhattan CBD, the largest total reduction would occur with Tolling Scenario E. Tolling Scenario E would also result in the largest reduction of vehicle crossings into the Manhattan CBD from Upper Manhattan at 60th Street and Brooklyn, while Tolling Scenario G would result in the largest reduction of vehicles crossing into the Manhattan CBD from Queens and New Jersey.

Changes in daily VMT by tolling scenario are shown in **Table 4A-6** (absolute values) **and Table 4A-7** (percentage change compared to the No Action Alternative). Consistent with changes in vehicles entering the Manhattan CBD, the largest reduction in regional VMT and VMT in New York City would occur under Tolling Scenario E. The greatest reduction in VMT on a percentage basis would occur on the West Side Highway/Route 9A south of 60th Street, with a maximum reduction of 20.5 percent under Tolling Scenario D. New York City Subarea 3 would have an increase in VMT under Tolling Scenarios A, B, C, and G of less than 0.1 percent to 0.3 percent. VMT on the FDR Drive would increase south of 60th Street in Tolling Scenario A, B, F, and G because of travelers seeking a free path around the Manhattan CBD using the FDR Drive and untolled ramps to the Brooklyn Bridge. VMT would increase by less than 0.2 percent in New Jersey in all tolling scenarios, mostly in Bergen and Middlesex Counties, from increased diversions to and from the George Washington Bridge and Outerbridge Crossing for through-trips avoiding the Manhattan CBD toll.

Table 4A-8 shows how many journeys would shift from passenger vehicles to transit and walking and biking for Manhattan CBD-related journeys. Changes are shown separately for journeys that originate outside and travel into the Manhattan CBD, journeys that originate inside and travel out of the Manhattan CBD, and journeys that are completely internal to the Manhattan CBD.

In all tolling scenarios, some Manhattan CBD-related journeys would shift to transit. Tolling Scenarios D and E would have the largest shift to transit (an increase in transit journeys up to 2.3 percent) to and from the Manhattan CBD. Transit journeys entirely within the Manhattan CBD would change 1 percent or less for all tolling scenarios (see **Table 4A-8**). Walking and biking trips would also increase slightly (up to 0.14 percent).

Table 4A-9 breaks down the numbers of Manhattan CBD-related journeys for private vehicles (drive alone and HOVs), taxis, and FHVs. **Table 4A-10** shows the shift in all Manhattan CBD-related transit journeys by tolling scenario.

Table 4A-6. Daily Vehicle-Miles Traveled: No Action Alternative and CBD Tolling Alternative, by Tolling Scenario (2023)

LOCATIONS	NO ACTION	SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
New York Counties	122,186,497	121,752,302	121,789,089	121,438,634	121,227,956	121,111,122	121,464,091	121,662,622
New York City	47,131,752	46,743,670	46,784,237	46,572,720	46,461,121	46,404,913	46,578,412	46,713,541
Manhattan CBD	3,244,791	2,993,214	2,998,489	2,984,080	2,963,211	2,946,339	3,016,013	2,970,819
CBD Core	1,217,727	1,150,843	1,152,471	1,161,407	1,159,162	1,147,545	1,183,476	1,142,077
Peripheral Highways (south of 60th Street; excluded from the toll)	2,027,064	1,842,371	1,846,018	1,822,673	1,804,049	1,798,794	1,832,537	1,828,742
West Side Highway/Route 9A	610,657	510,785	513,887	493,396	485,167	486,404	501,603	508,951
FDR Drive	720,682	725,459	729,706	718,820	705,903	710,555	721,421	727,101
Bridges Tunnels	695,725	606,127	602,425	610,457	612,979	601,835	609,513	592,690
NYC Subarea 1 (see Figure 4A-2)	2,218,077	2,049,561	2,049,528	2,004,366	1,955,714	1,944,168	1,962,310	2,031,243
NYC Subarea 2 (see Figure 4A-2)	6,660,953	6,626,001	6,630,016	6,588,313	6,578,676	6,568,162	6,596,549	6,615,308
NYC Subarea 3 (see Figure 4A-2)	35,007,931	35,074,894	35,106,204	34,995,961	34,963,520	34,946,244	35,003,540	35,096,171
Long Island Counties (2)	41,585,545	41,609,407	41,595,736	41,546,248	41,503,705	41,497,676	41,598,789	41,573,420
New York Counties North of New York City (5)	33,469,200	33,399,225	33,409,116	33,319,666	33,263,130	33,208,533	33,286,890	33,375,661
New Jersey Counties (14)	97,578,100	97,594,939	97,590,826	97,748,567	97,733,034	97,665,181	97,768,338	97,642,310
Connecticut Counties (2)	34,909,870	34,878,673	34,856,848	34,830,279	34,846,493	34,842,671	34,893,239	34,844,682
TOTAL	254,674,467	254,225,914	254,236,763	254,017,480	253,807,483	253,618,974	254,125,668	254,149,614

Notes:

1. The number of counties are indicated within parentheses ( ).
2. Unless noted, the terms "Vehicle-Miles Traveled" or "VMT" in this subchapter refer to miles traveled by all on-road vehicles, including single-occupancy vehicles, HOVs, motorcycles, taxis, FHVs, buses, and trucks.

Table 4A-7. Percentage Change (compared to No Action Alternative) in Daily Vehicle-Miles Traveled by Tolling Scenario (2023)

LOCATIONS	SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
New York Counties	-0.4	-0.3	-0.6	-0.8	-0.9	-0.6	-0.4
New York City	-0.8%	-0.7%	-1.2%	-1.4%	-1.5%	-1.2%	-0.9%
Manhattan CBD	-7.8%	-7.6%	-8.0%	-8.7%	-9.2%	-7.1%	-8.4%
CBD Core	-5.5%	-5.4%	-4.6%	-4.8%	-5.8%	-2.8%	-6.2%
Peripheral Highways (south of 60th Street; excluded from the toll)	-9.1%	-8.9%	-10.1%	-11.0%	-11.3%	-9.6%	-9.8%
West Side Highway/Route 9A	-16.4%	-15.8%	-19.2%	-20.5%	-20.3%	-17.9%	-16.7%
FDR Drive	0.7%	1.3%	-0.3%	-2.1%	-1.4%	0.1%	0.9%
Bridges Tunnels	-12.9%	-13.4%	-12.3%	-11.9%	-13.5%	-12.4%	-14.8%
NYC Subarea 1 (see Figure 4A-2)	-7.6%	-7.6%	-9.6%	-11.8%	-12.3%	-11.5%	-8.4%
NYC Subarea 2 (see Figure 4A-2)	-0.5%	-0.5%	-1.1%	-1.2%	-1.4%	-1.0%	-0.7%
NYC Subarea 3 (see Figure 4A-2)	0.2%	0.3%	0.0%	-0.1%	-0.2%	0.0%	0.3%
Long Island Counties (2)	0.1	0.0	-0.1	-0.2	-0.2	0.0	0.0
New York Counties North of New York City (5)	-0.2	-0.2	-0.4	-0.6	-0.8	-0.5	-0.3
New Jersey Counties (14)	0.0	0.0	0.2	0.2	0.1	0.2	0.1
Connecticut Counties (2)	-0.1	-0.2	-0.2	-0.2	-0.2	0.0	-0.2
TOTAL	-0.2	-0.2	-0.3	-0.3	-0.4	-0.2	-0.2

Note: The number of counties are indicated within parentheses ( ).

Table 4A-8. Daily Manhattan CBD Journey Mode Share (compared to No Action Alternative) by Tolling Scenario (2023)

DIRECTION OF JOURNEY	NO ACTION	SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
Beginning Outside the Manhattan CBD								
Auto (including HOV, Taxi, FHV)	19.1%	18.0%	18.1%	17.7%	17.0%	16.8%	17.3%	17.7%
Transit	78.2%	79.3%	79.2%	79.6%	80.3%	80.5%	80.0%	79.6%
Walk and Bike	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%
Change in Transit Share		1.1%	1.0%	1.4%	2.1%	2.3%	1.8%	1.4%
Beginning Inside the Manhattan CBD								
Auto (including HOV, Taxi, FHV)	30.2%	28.9%	29.0%	28.5%	27.6%	27.6%	28.2%	27.9%
Transit	51.5%	52.4%	52.3%	52.6%	53.4%	53.4%	52.9%	53.6%
Walk and Bike	18.3%	18.7%	18.7%	18.9%	19.0%	19.0%	18.9%	18.5%
Change in Transit Share		0.9%	0.8%	1.1%	1.9%	1.9%	1.4%	2.1%
Beginning and Ending Within the Manhattan CBD								
Auto (including HOV, Taxi, FHV)	7.1%	7.1%	7.2%	7.2%	7.2%	7.1%	7.1%	7.3%
Transit	27.5%	27.5%	27.3%	27.5%	27.6%	27.6%	27.5%	27.7%
Walk and Bike	65.4%	65.4%	65.5%	65.3%	65.2%	65.3%	65.4%	65.0%
Change in Transit Share		0.0%	-0.2%	0.0%	0.1%	0.1%	0.0%	0.2%
All Manhattan CBD-Related Journeys								
Auto (including HOV, Taxi, FHV)	16.2%	15.3%	15.5%	15.1%	14.6%	14.5%	14.9%	15.1%
Transit	61.7%	62.5%	62.4%	62.7%	63.2%	63.3%	63.0%	62.8%
Walk and Bike	22.1%	22.2%	22.1%	22.2%	22.2%	22.2%	22.1%	22.1%
Change in Transit Share		0.8%	0.7%	1.0%	1.5%	1.6%	1.3%	1.1%

Note: Table includes only journeys made by single-occupancy vehicles, HOVs, taxis, FHVs, motorcycles, public transit, bicycle, and walking, but does not include commercial trucks.

Table 4A-9. Daily Manhattan CBD-Related Auto-Based Vehicle Person-Journeys (compared to No Action Alternative) by Tolling Scenario (2023)

MODE	NO ACTION	SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
Private Vehicles (drive alone and HOVs)	412,721	397,185	393,224	387,136	380,656	370,785	374,743	393,570
	Difference	-15,536	-19,497	-25,585	-32,065	-41,936	-37,978	-19,151
	Percentage	-3.8%	-4.7%	-6.2%	-7.8%	-10.2%	-9.2%	-4.6%
Taxi/FHV	64,695	56,165	64,314	59,995	50,713	57,081	63,737	55,450
	Difference	-8,530	-381	-4,700	-13,982	-7,614	-958	-9,245
	Percentage	-13.2%	-0.6%	-7.3%	-21.6%	-11.8%	-1.5%	-14.3%
TOTAL	477,416	453,350	457,538	447,131	431,369	427,866	438,480	449,020
	Difference	-24,066	-19,878	-30,285	-46,047	-49,550	-38,936	-28,396
	Percentage	-5.0	-4.2	-6.3	-9.6	-10.4	-8.2	-5.9

Table 4A-10. Daily Manhattan CBD-Related Transit Journeys (compared to No Action Alternative) by Tolling Scenario (2023)

NO ACTION	SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
1,833,770	1,856,016	1,856,487	1,864,633	1,874,509	1,878,700	1,872,355	1,860,737
Difference	22,246	22,717	30,863	40,739	44,930	38,585	26,967
Percentage	1.2%	1.2%	1.7%	2.2%	2.5%	2.1%	1.5%

4A.4.3 2045 CBD Tolling Alternative

This section compares key measures for the horizon year (2045) forecasts with and without the Project. Manhattan CBD tolls in 2045 are assumed to grow consistent with inflation between 2023 and 2045. Socioeconomic conditions from 2045 are provided by NYMTC and are consistent with the NYMTC 2017 Regional Transportation Plan.

Appendix 4A.2, "Transportation: Travel Forecast Tolling Scenario Summaries and Detailed Tables," provides detailed statistics for each of the forecasts.

Table 4A-11 and Table 4A-12 show the daily vehicles[21] entering or passing through the Manhattan CBD by tolling scenario for 2045. (Absolute number and percentage change compared to the No Action Alternative are shown.) The horizon year (2045) analysis shows results similar to the opening year (2023). The largest total reduction in vehicles entering the Manhattan CBD would occur with Tolling Scenario E. Tolling Scenario E would also result in the largest reduction of vehicle crossings into the Manhattan CBD from Upper Manhattan at 60th Street and Brooklyn, while Tolling Scenario G would result in the largest reduction of vehicles crossing into the Manhattan CBD from Queens and New Jersey.

Table 4A-13 shows the regional VMT by tolling scenario, and **Table 4A-14** shows the percentage change from the No Action Alternative for 2045. Tolling Scenario E would reduce VMT the most at the regional level, across the New York City subareas, and in the Manhattan CBD, the last of which would experience an 8.7 percent reduction in VMT. Localized increases in VMT would be experienced on the FDR Drive south of 60th Street under Tolling Scenarios A, B, and G because travelers would seek a free path around the Manhattan CBD using the FDR Drive and untolled ramps to the Brooklyn Bridge.

Table 4A-15 shows changes in the share of travelers driving, using transit, and walking and biking compared to the No Action Alternative for 2045. For all Manhattan CBD-related journeys, the change in the number of journeys by transit would be between 0.6 percent and 1.5 percent, which represents an increase of 20,000 to 50,000 transit passengers. Journeys on transit that begin outside the Manhattan CBD would increase up to 2.2 percent for Tolling Scenario E. **Table 4A-16** breaks down the numbers of Manhattan CBD-related journeys for people in vehicles (drive alone and HOVs) and people in taxis and FHVs. **Table 4A-17** shows the shift in all Manhattan CBD-related transit journeys compared to the No Action Alternative by tolling scenario for 2045.

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21 Unless noted, the term "vehicles" in this subchapter refers to all on-road vehicles, including single-occupancy vehicles, HOVs, motorcycles, taxis, FHVs, buses, and trucks.

Table 4A-11. Daily Vehicles Entering the Manhattan CBD by Crossing Locations: No Action Alternative and Tolling Scenarios (2045)

CROSSING LOCATIONS	NO ACTION	SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
60th Street	288,876	236,408	239,250	226,243	212,735	211,409	216,884	233,737
FDR Drive and West Side Highway/Route 9A	168,499	159,420	161,258	155,262	149,310	148,025	151,119	158,853
West Side Avenues	31,920	25,300	25,946	24,035	21,961	22,067	22,849	25,529
East Side Avenues	88,457	51,688	52,046	46,946	41,464	41,317	42,916	49,355
Queens	154,348	138,824	138,730	142,997	147,894	147,558	148,430	136,884
Brooklyn	192,604	172,530	173,247	159,307	143,498	141,693	143,711	169,120
New Jersey	114,867	100,060	99,252	107,304	113,390	109,619	112,875	96,443
TOTAL	750,695	647,822	650,479	635,851	617,517	610,279	621,900	636,184

* In this table, vehicle volumes reported as entering the Manhattan CBD on the FDR Drive and the West Side Highway/Route 9A are all vehicles traveling south on these facilities at 60th Street regardless of whether the vehicle eventually enters the Manhattan CBD from one of these facilities. Some vehicles reported in this table may use the West Side Highway/Route 9A and the FDR Drive to access the Hugh L. Carey Tunnel or Brooklyn Bridge without ever entering the Manhattan CBD. These volumes are reported in this manner to be consistent with how vehicle count data is published in the annual NYMTC *Hub Bound Travel Data Report*.

Table 4A-12. Percentage Change (compared to No Action Alternative) in Daily Vehicles Entering the Manhattan CBD by Crossing Locations and Tolling Scenario (2045)

CROSSING LOCATIONS	SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
60th Street	-18.2	-17.2	-21.7	-26.4	-26.8	-24.9	-19.1
FDR Drive and West Side Highway/Route 9A	-5.4%	-4.3%	-7.9%	-11.4%	-12.2%	-10.3%	-5.7%
West Side Avenues	-20.7%	-18.7%	-24.7%	-31.2%	-30.9%	-28.4%	-20.0%
East Side Avenues	-41.6%	-41.2%	-46.9%	-53.1%	-53.3%	-51.5%	-44.2%
Queens	-10.1	-10.1	-7.4	-4.2	-4.4	-3.8	-11.3
Brooklyn	-10.4	-10.1	-17.3	-25.5	-26.4	-25.4	-12.2
New Jersey	-12.9	-13.6	-6.6	-1.3	-4.6	-1.7	-16.0
TOTAL	-13.7	-13.3	-15.3	-17.7	-18.7	-17.2	-15.3

* In this table, vehicle volumes reported as entering the Manhattan CBD on the FDR Drive and the West Side Highway/Route 9A are all vehicles traveling south on these facilities at 60th Street regardless of whether the vehicle eventually enters the Manhattan CBD from one of these facilities. Some vehicles reported in this table may use the West Side Highway/Route 9A and the FDR Drive to access the Hugh L. Carey Tunnel or Brooklyn Bridge without ever entering the Manhattan CBD. These volumes are reported in this manner to be consistent with how vehicle count data is published in the annual NYMTC *Hub Bound Travel Data Report*.

Table 4A-13. Daily Vehicle-Miles Traveled: No Action Alternative and Tolling Scenarios (2045)

LOCATIONS	NO ACTION	SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
New York State	134,186,361	133,549,102	133,603,123	133,407,441	133,011,541	132,941,187	133,056,675	133,576,575
New York City	49,748,914	49,306,506	49,361,708	49,206,260	48,917,855	48,908,967	49,014,661	49,271,140
Manhattan CBD	3,402,711	3,173,972	3,199,881	3,156,249	3,117,142	3,106,570	3,147,541	3,144,017
CBD Core	1,262,019	1,211,069	1,219,101	1,222,077	1,236,236	1,230,340	1,246,015	1,197,152
Peripheral Highways (south of 60th Street; excluded from the toll)	2,140,692	1,962,903	1,980,780	1,934,172	1,880,906	1,876,230	1,901,526	1,946,865
West Side Highway/Route 9A	647,671	554,316	562,018	528,271	500,214	499,855	509,900	550,459
FDR Drive	758,659	760,056	770,395	754,497	733,879	739,383	743,921	763,263
Bridges Tunnels	734,362	648,531	648,367	651,404	646,813	636,992	647,705	633,143
NYC Subarea 1 (see Figure 4A-2)	2,349,929	2,195,311	2,199,825	2,155,278	2,113,309	2,104,806	2,123,309	2,173,895
NYC Subarea 2 (see Figure 4A-2)	7,142,863	7,086,769	7,098,540	7,060,838	7,013,071	7,012,113	7,032,663	7,083,658
NYC Subarea 3 (see Figure 4A-2)	36,853,411	36,850,454	36,863,462	36,833,895	36,674,333	36,685,478	36,711,148	36,869,570
Long Island Counties (2)	46,813,526	46,752,292	46,709,696	46,716,462	46,732,209	46,699,238	46,688,529	46,757,385
New York Counties North of New York City (5)	37,623,921	37,490,304	37,531,719	37,484,719	37,361,477	37,332,982	37,353,485	37,548,050
New Jersey Counties (14)	107,907,842	107,914,688	107,948,940	108,040,676	107,970,946	107,950,075	108,024,196	107,882,082
Connecticut Counties (2)	35,063,470	35,045,234	35,006,855	35,042,347	35,004,182	35,002,445	34,998,648	35,059,459
TOTAL	277,157,673	276,509,024	276,558,918	276,490,464	275,986,669	275,893,707	276,079,519	276,518,116

Note: The number of counties are indicated within parentheses ( ).

Table 4A-14. Percentage Change (compared to No Action Alternative) in Daily Vehicle-Miles Traveled by Tolling Scenario (2045)

LOCATIONS	SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
New York State	-0.5	-0.4	-0.6	-0.9	-0.9	-0.8	-0.5
New York City	-0.9%	-0.8%	-1.1%	-1.7%	-1.7%	-1.5%	-1.0%
Manhattan CBD	-6.7%	-6.0%	-7.2%	-8.4%	-8.7%	-7.5%	-7.6%
CBD Core	-4.0%	-3.4%	-3.2%	-2.0%	-2.5%	-1.3%	-5.1%
Peripheral Highways (south of 60th Street; excluded from the toll)	-8.3%	-7.5%	-9.6%	-12.1%	-12.4%	-11.2%	-9.1%
West Side Highway/Route 9A	-14.4%	-13.2%	-18.4%	-22.8%	-22.8%	-21.3%	-15.0%
FDR Drive	0.2%	1.5%	-0.5%	-3.3%	-2.5%	-1.9%	0.6%
Bridges Tunnels	-11.7%	-11.7%	-11.3%	-11.9%	-13.3%	-11.8%	-13.8%
NYC Subarea 1 (see Figure 4A-2)	-6.6%	-6.4%	-8.3%	-10.1%	-10.4%	-9.6%	-7.5%
NYC Subarea 2 (see Figure 4A-2)	-0.8%	-0.6%	-1.1%	-1.8%	-1.8%	-1.5%	-0.8%
NYC Subarea 3 (see Figure 4A-2)	0.0%	0.0%	-0.1%	-0.5%	-0.5%	-0.4%	0.0%
Long Island Counties (2)	-0.1	-0.2	-0.2	-0.2	-0.2	-0.3	-0.1
New York Counties North of New York City (5)	-0.4	-0.2	-0.4	-0.7	-0.8	-0.7	-0.2
New Jersey Counties (14)	0.0	0.0	0.1	0.1	0.0	0.1	0.0
Connecticut Counties (2)	-0.1	-0.2	-0.1	-0.2	-0.2	-0.2	0.0
TOTAL	-0.2	-0.2	-0.2	-0.4	-0.5	-0.4	-0.2

Note: The number of counties are indicated within parentheses ( ).

Table 4A-15. Daily Manhattan CBD Journey Mode Share: No Action Alternative and Tolling Scenarios (2045)

	NO ACTION	SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
Beginning Outside the Manhattan CBD								
Auto (including HOV, Taxi, FHV)	17.7%	16.6%	16.9%	16.4%	15.7%	15.5%	15.9%	16.4%
Transit	79.7%	80.8%	80.5%	81.0%	81.7%	81.9%	81.5%	81.0%
Walk and Bike	2.6%	2.6%	2.6%	2.6%	2.6%	2.6%	2.6%	2.6%
Change in Transit Share	—	1.1%	0.8%	1.3%	2.0%	2.2%	1.8%	1.3%
Beginning Inside the Manhattan CBD								
Auto (including HOV, Taxi, FHV)	29.7%	28.3%	28.7%	28.1%	27.2%	27.1%	27.7%	27.6%
Transit	52.1%	53.0%	52.7%	53.1%	53.9%	53.8%	53.4%	54.0%
Walk and Bike	18.2%	18.7%	18.6%	18.8%	18.9%	19.1%	18.9%	18.4%
Change in Transit Share	—	0.9%	0.6%	1.0%	1.8%	1.7%	1.3%	1.9%
Within the Manhattan CBD								
Auto (including HOV, Taxi, FHV)	6.9%	7.0%	7.1%	7.0%	7.0%	7.0%	6.9%	6.9%
Transit	27.4%	27.4%	27.3%	27.4%	27.5%	27.5%	27.5%	27.8%
Walk and Bike	65.7%	65.6%	65.6%	65.6%	65.5%	65.5%	65.6%	65.2%
Change in Transit Share	—	0.0%	-0.1%	0.0%	0.1%	0.1%	0.1%	0.4%
All Manhattan CBD-Related Journeys								
Auto (including HOV, Taxi, FHV)	15.3%	14.5%	14.7%	14.3%	13.8%	13.7%	13.9%	14.3%
Transit	62.9%	63.7%	63.5%	63.8%	64.3%	64.4%	64.2%	64.0%
Walk and Bike	21.8%	21.8%	21.8%	21.9%	21.9%	21.9%	21.9%	21.8%
Change in Transit Share	—	0.8%	0.6%	0.9%	1.4%	1.5%	1.3%	1.1%

Table 4A-16. Daily Manhattan CBD-Related Auto-Based Vehicle Person-Journeys: No Action Alternative and Tolling Scenarios (2045)

MODE	NO ACTION	SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
Private Vehicles (drive alone and HOVs)	413,933	397,688	397,043	388,905	380,950	371,699	374,270	393,717
	Difference	-16,245	-16,890	-25,028	-32,983	-42,234	-39,663	-20,216
	Percentage	-3.9%	-4.1%	-6.0%	-8.0%	-10.2%	-9.6%	-4.9%
Taxi/FHV	65,930	57,711	65,695	61,423	51,777	57,977	64,241	56,056
	Difference	-8,219	-235	-4,507	-14,153	-7,953	-1,689	-9,874
	Percentage	-12.5%	-0.4%	-6.8%	-21.5%	-12.1%	-2.6%	-15.0%
TOTAL	479,863	455,399	462,738	450,328	432,727	429,676	438,511	449,773
	Difference	-24,464	-17,125	-29,535	-47,136	-50,187	-41,352	-30,090
	Percentage	-5.1	-3.6	-6.2	-9.8	-10.5	-8.6	-6.3%

Note: Table includes only motorized journeys.

Table 4A-17. Daily Manhattan CBD-Related Transit Journeys: No Action Alternative and Tolling Scenarios (2045)

NO ACTION	SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
1,990,024	2,014,453	2,011,180	2,021,324	2,033,609	2,038,364	2,033,022	2,018,632
Difference	24,429	21,156	31,300	43,585	48,340	42,998	28,608
Percentage	1.2%	1.1%	1.6%	2.2%	2.4%	2.2%	1.4%

4A.4.4 CBD Tolling Alternative Tolling Scenario Summaries

All tolling scenarios within the CBD Tolling Alternative would result in travel pattern changes that would support congestion relief: reduced automobile and truck trips to the Manhattan CBD, reduced VMT to and within the Manhattan CBD and regionally, and a shift from auto trips to transit.[22] Percentage reductions in 2023 vehicle trips entering the Manhattan CBD range from 15.4 percent (Tolling Scenario A) to 19.9 percent (Tolling Scenario E; see **Table 4A-5**). As summarized in **Chapter 2, "Project Alternatives,"** the primary differences revolve around the magnitude and the distribution of the reductions resulting from the toll rates and potential crossing credits, which vary by tolling scenario. **Appendix 4A.2, "Transportation: Travel Forecast Tolling Scenario Summaries and Detailed Tables,"** describes the opening year (2023) travel pattern changes for each tolling scenario followed by horizon year (2045) travel pattern changes for each tolling scenario compared to the No Action Alternative, and also provides details for both the 2023 and 2045 results. While the results of the 2045 model runs are different in terms of actual numbers (because they reflect the longer-term background growth in the model's forecast), the patterns from tolling scenario to tolling scenario are consistent between 2023 and 2045.

4A.4.5 Key Findings

The BPM assessment of regional travel demand and trip characteristics shows that implementing the CBD Tolling Alternative would reduce vehicular traffic within the Manhattan CBD compared to the No Action Alternative in all tolling scenarios analyzed. Based on the BPM, which looks at the time and cost associated with a trip-making decision, the imposition of a Manhattan CBD toll would reduce the number of vehicles entering the Manhattan CBD compared to the No Action Alternative for both the 2023 and the longer-term 2045 analysis years.

With the CBD Tolling Alternative, total regional VMT and vehicle-hours traveled would be reduced. The largest changes would occur in the Manhattan CBD and would diminish farther away from the Manhattan CBD. Roughly three-quarters of the auto-trip reductions into and through the Manhattan CBD would result from travelers avoiding the Manhattan CBD for through-trips (e.g., Jersey City to Brooklyn). These trips either would switch modes or, more often, would find alternative paths around the Manhattan CBD. Other auto-trip reductions would result from people switching modes for trips into the Manhattan CBD. Modeling of the CBD Tolling Alternative indicates that drivers would have three basic ways to avoid paying the Manhattan CBD toll:

- Switch to another mode such as transit.
- Choose a new and different path to avoid the Manhattan CBD for vehicular through-trips.
- Choose not to make the trip to the Manhattan CBD.

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22 Buses on the roadways are included in the calculation of volumes and VMT. However, the number of buses reflects the No Action Alternative and does not vary between the No Action Alternative and CBD Tolling Alternative. This is because the model does not include additional buses that may be needed to serve increased transit demand. **Subchapter 4C, "Transportation: Transit"** provides an analysis of transit demand.

AUTO TRIPS

Across all the tolling scenarios, non-taxi, Manhattan CBD-related auto-based person-journeys would decline between 4 percent and 10 percent in the 2023 analysis year, representing 16,000 to 42,000 fewer people accessing the Manhattan CBD in a private automobile[23] on an average weekday (see **Table 4A-9**). Among drivers who would continue to drive to the Manhattan CBD, some would choose different routings under tolling scenarios that introduce crossing credits.

For Tolling Scenarios A and D, taxis and FHVs would have a higher sensitivity to the Manhattan CBD toll because they would be charged each time they enter the Manhattan CBD, while private automobiles would be charged just once per day. Overall, the total decline in auto-based person-journeys to the Manhattan CBD would be between 24,000 and 46,000 person-journeys for Tolling Scenario A and Tolling Scenario D.

Subchapter 4B, "Transportation: Highways and Local Intersections," examines the potential impacts on highways and local intersections from changes in traffic volumes projected under the CBD Tolling Alternative.

TIME-OF-DAY SHIFTING

Because the traffic in the Manhattan CBD builds throughout the day, extending well into the evening, six of the seven tolling scenarios considered in this analysis (Tolling Scenarios A through E, plus Tolling Scenario G), have extended peak periods from 6:00 a.m. to 8:00 p.m. Tolling Scenario F has peak periods more consistent with those on the surrounding bridges and tunnels, from 6:00 a.m. to 10 a.m. and 4:00 p.m. to 8:00 p.m.

While arguably less important for this Project, which aims to move people from their vehicles to transit, time of day still has a role to play and is helpful to consider briefly.

In 2005, PANYNJ studied the impact of peak-period tolling on trip diversions to the off-peak period.[24] The study evaluated whether travelers shifted to the off-peak period after the PANYNJ implemented a $1 discount (20 percent lower than the peak period) for off-peak travel in 2001 on its roadway facilities entering New York City. The key findings relevant to this study indicated the following:

- Some people switched travel to the preceding hour in the AM peak.
- Trucks did not change their time-of-day choice in response to the 20 percent price difference, in part because their delivery times are dependent upon receivers and shippers.[25]

The study indicated about 10 percent of travelers were willing to shift their travel times based on time-of-day tolling, with many travelers indicating they do not have flexibility to change their travel times. The

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23 Person-journey reductions in private automobile includes drive-alone person-journeys and HOV or carpool person-journeys. Carpool person-journeys result in fewer vehicular trips than person-journeys due to higher auto occupancy.

24 Holguín-Veras, J., K. Ozbay, and A. C. de Cerreño. (2005). *Evaluation Study of Port Authority of New York and New Jersey's Time of Day Pricing Initiative*.

25 The CBD tolling scenarios would offer a deeper reduction in the overnight (50 *to 60* percent lower than peak-travel), which would encourage some travelers and some trucks to shift.

average amount of time travelers were willing to arrive early was 20 minutes, and the average amount of time travelers were willing or able to be late was 12 minutes.

AUTO AND TRUCK TRAVEL-TIME SAVINGS

The Project would alter the driving paths people choose to access the Manhattan CBD. Tolling Scenario A does not include any crossing credits and would result in a general reduction of auto travel to the Manhattan CBD from across the region. Due to reduced congestion, auto travel times to the Manhattan CBD would be faster in each tolling scenario from most areas of the region compared to the No Action Alternative. Some trips would experience longer auto travel times to the Manhattan CBD due to increased diversionary trips avoiding the Manhattan CBD via highways in the Bronx and Staten Island. For example, auto and truck trips from Connecticut would be slower to the Manhattan CBD due to increased diversionary traffic on the Cross Bronx Expressway and Bruckner Expressway. Longer auto and truck travel times from Central New Jersey and Staten Island would result from increased traffic on the Staten Island Expressway.

Crossing credits would make the Hugh L. Carey and Queens-Midtown Tunnels relatively more attractive to the Brooklyn, Manhattan, and Williamsburg Bridges compared to Tolling Scenario A because the net toll paid by a driver using a tolled tunnel would be closer to the cost of using one of the untolled bridges. This leveling of net tolls across the East River would increase traffic in the East River tunnels and decrease traffic on the East River bridges. As a result of this increased tunnel traffic, in tolling scenarios with crossing credits, some auto and truck travel times from Long Island to the Manhattan CBD would increase due to additional congestion in the Queens-Midtown Tunnel.

Similar diversions would also occur in Northern New Jersey and Southern Orange and Rockland Counties because traffic would move to the Lincoln and Holland Tunnels from the George Washington Bridge to take advantage of the tunnel crossing credits in Tolling Scenarios C, D, and E. However, traffic volumes at the Lincoln and Holland Tunnels still decrease in all scenarios.

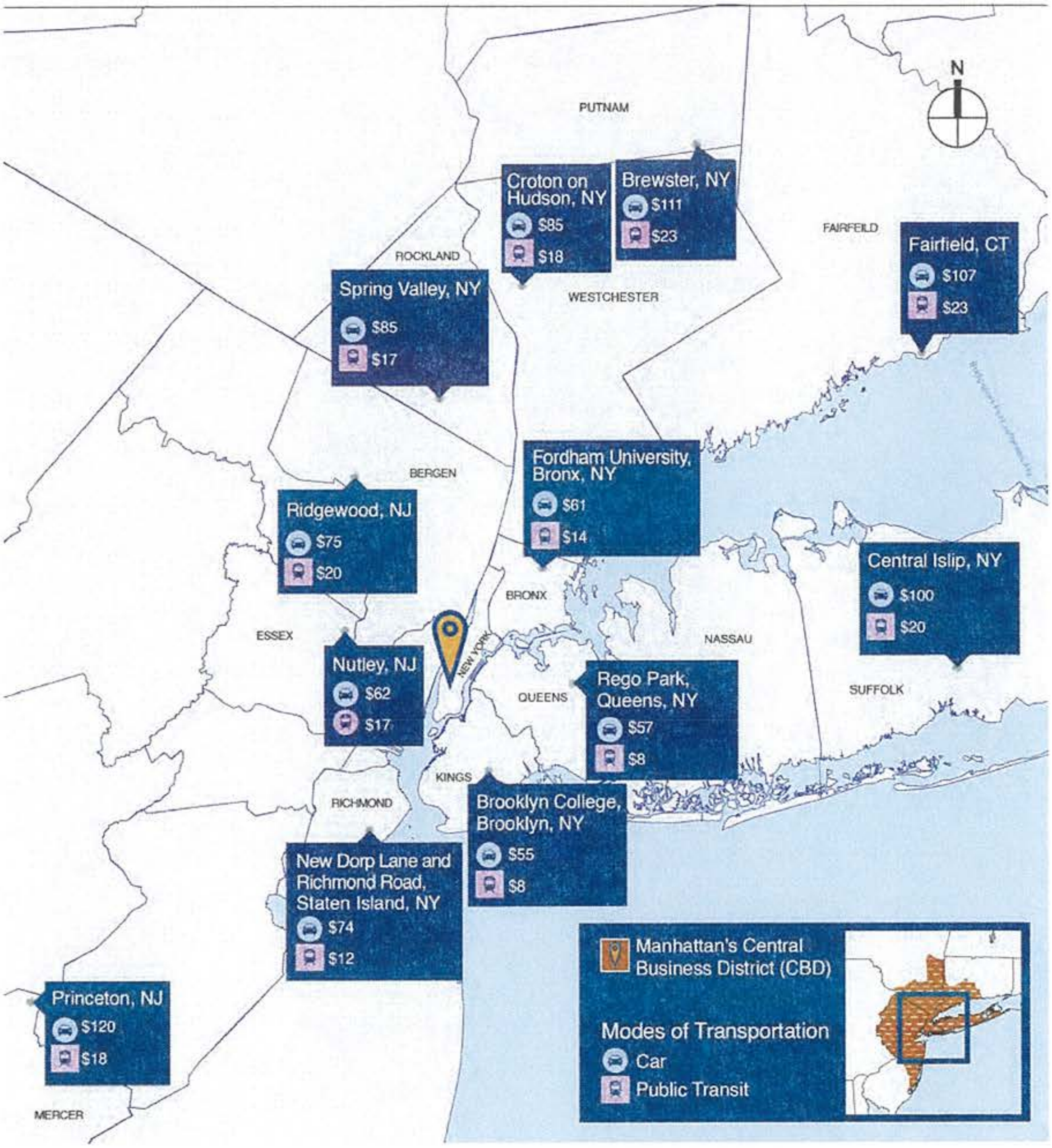
AUTO AND TRANSIT COMMUTE COSTS

The monetary cost of accessing the Manhattan CBD by auto versus transit is also important to take note of. The Manhattan CBD is the anchor of the regional economy and a destination for millions of daily trips. As discussed in many chapters of this EA, the vast majority of these trips are made via public transportation, but there are also tens of thousands of trips made by auto commuters. There are likely many reasons why a person may prefer to drive to Manhattan, but choosing to drive is an expensive undertaking for many reasons—notably extra vehicle operating costs due to congestion, existing tolls on various facilities, and limited and expensive parking.

To establish perspective, a representational typical commute from throughout the region has been evaluated to estimate the daily average cost of that trip either by auto or by transit. As shown in **Figure 4A-3**, this includes locations in New York City (Bronx, Queens, Brooklyn, and Staten Island), on Long Island (Central Islip), in New York communities to the north of New York City (Spring Valley, Croton-on-Hudson, Brewster), in New Jersey (Ridgewood to the north, Nutley in the central area, and Princeton to the south), and in Connecticut (Fairfield County). The average cost of each representative trip was developed using trip destinations to both a lower (World Trade Center) and upper (42nd Street, Bryant Park) Manhattan CBD location, which reflect different costs due to different routing and transit options. For these trips, when the cost of mileage, parking, and tolls are factored in, it is less expensive to take transit to the Manhattan CBD than to use a car.

For those who continue to use a car to travel to the Manhattan CBD, the overall trip cost would increase with the CBD Tolling Alternative because the CBD toll would be applied. During early public outreach, concern was raised by drivers who already pay tolls on tunnels and bridges before they enter the Manhattan CBD. To better understand the cost implications for drivers currently paying tolls to access the Manhattan CBD, **Table 4A-18** provides information on the percentage increase in the cost of travel by auto that drivers could expect under the CBD Tolling Alternative for each tolling scenario for a representative trip to the World Trade Center. **Table 4A-19** further provides sample toll costs for those same trips when using different crossing facilities.

[Figure 4A-3. Representative Commuting Costs in the Regional Study Area]



Source: WSP, Best Practice Model, Google Maps

Notes: See **Appendix 4A.3, "Transportation: Representative Commuting Costs by Auto and Transit"** for more detail on costs shown here.

1. Cost based on auto distance as measured by the BPM travel demand model and averaged for two destinations within the CBD (World Trade Center and 42nd Street, Bryant Park).
2. A typical driving route and transit route were obtained by reviewing recommended directions from Google Maps for an approximately 7:30 a.m. commute trip (and were compared for consistency with the BPM results).
3. Costs include the daily round-trip mileage expense using IRS Q1 2022 auto operating rate of 58.5 cents per mile, all applicable tolls, and parking.
4. For transit, the costs include the single or combination of fares and an added level of origin parking and destination travel cost.

Table 4A-18. Percentage Change in Round-Trip Driving Costs for Representative Route by Auto to the World Trade Center Using E-ZPass at 7:30 a.m.

				CBD TOLLING ALTERNATIVE – INCREASE IN TRAVEL COST BY TOLLING SCENARIO (CBD TOLL FOR E-PASS PEA AUTO)						
				SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
COUNTY	ORIGIN	CROSSING USED FOR ROUNDTRIP	NO ACTION ALTERNATIVE TRAVEL COST	Base Plan (9)	Base Plan with Caps and Exemptions (10)	Low Crossing Credits for Vehicles Using Tunnels to Access the CBD, with Some Caps and Exemptions (14)	High Crossing Credits for Vehicles Using Tunnels to Access the CBD (19)	High Crossing Credits for Vehicles Using Tunnels to Access the CBD, with Some Caps and Exemptions (23)	High Crossing Credits for Vehicles Using Manhattan Bridges and Tunnels to Access the CBD, with Some Caps and Exemptions (23)	Base Plan with Same Tolls for All Vehicle Classes (12)
The Bronx	Fordham University	RFK	$62	14.9%	16.4%	22.6%	30.7%	37.2%	16.0%	18.7%
Brooklyn	Brooklyn College	HCT	$54	17.1%	18.9%	13.9%	11.0%	18.4%	18.4%	21.6%
Queens	Rego Park	QMT	$59	15.6%	17.2%	12.6%	10.0%	16.8%	16.8%	19.7%
Staten Island	New Dorp	HCT	[ ]	[3]	[ ]	[ ]	[ ]	[ ]	[ ]	[3]
Suffolk	Central Islip	QMT	$102	9.0%	9.9%	7.3%	5.8%	9.7%	9.7%	11.4%
Rockland	Spring Valley	GWB	$86	10.7%	11.8%	16.3%	22.1%	26.8%	11.5%	13.5%
Westchester	Croton-on-Hudson	HHB	$86	10.6%	11.7%	16.2%	22.0%	26.6%	19.7%	13.4%
Putnam	Brewster	RFK	$116	7.9%	8.8%	12.1%	16.4%	19.9%	8.6%	10.0%
Bergen	Ridgewood	HT	$76	12.1%	13.3%	9.8%	7.8%	13.0%	13.0%	15.2%
Essex	Nutley	HT	$64	14.4%	15.8%	11.6%	9.2%	15.4%	15.4%	18.1%
Mercer	Princeton	HT	$116	7.9%	8.7%	6.4%	5.1%	8.5%	8.5%	10.0%
Fairfield	Fairfield	RFK	$113	8.1%	9.0%	12.4%	16.8%	20.3%	8.8%	10.3%

Source: WSP, BPM, Google Maps

Notes: See **Appendix 4A.3, "Transportation: Representative Commuting Costs by Auto and Transit"** for more detail on the No Action Alternative costs in this table.

1. Auto costs based on the auto route distance as measured by the BPM travel demand model.
2. A typical driving route was obtained by reviewing recommended directions from Google Maps for an approximately 7:30 a.m. commute trip (and were compared for consistency with the BPM results).
3. Costs include the daily round-trip mileage expense using IRS Q1 2022 auto operating rate of 58.5cents per mile, all applicable tolls and parking.
4. GWB–George Washington Bridge; HCT–Hugh L. Carey Tunnel; HHB–Henry Hudson Bridge; HT–Holland Tunnel; QMT–Queens Midtown Tunnel; RFK–Robert F. Kennedy Bridge.

[5. Driving cost from Staten Island assumes Verrazzano-Narrows Bridge tolls are $2.75 each way, which is consistent with the effective toll rate in MTA's Staten Island Resident Rebate Program.]

Table 4A-19. Total Tolls, Round-Trip, for Representative Routes by Auto to the World Trade Center Using E-ZPass at 7:30 a.m.

COUNTY	ORIGIN	CROSSING USED FOR ROUNDTRIP[1]	NO ACTION ALTERNATIVE TOLL COST, ROUND TRIP[2]	CBD TOLLING ALTERNATIVE – TOTAL TOLLS BY TOLLING SCENARIO(CBD TOLL FOR E PASS PEA AUTO)						
				SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
				Base Plan (9)	Base Plan with Caps and Exemptions (10)	Low Crossing Credits for Vehicles Using Tunnels to Access the CBD, with Some Caps and Exemptions (14)	High Crossing Credits for Vehicles Using Tunnels to Access the CBD (19)	High Crossing Credits for Vehicles Using Tunnels to Access the CBD, with Some Caps and Exemptions (23)	High Crossing Credits for Vehicles Using Manhattan Bridges and Tunnels to Access the CBD, with Some Caps and Exemptions (23)	Base Plan with Same Tolls for All Vehicle Classes (12)
The Bronx	Fordham University	Robert F Kennedy Bridge	$13.10	$22.10	$23.10	$27.10	$32.10	$36.10	$23.00	$25.10
		Willis Ave Bridge	$0	$9.00	$10.00	$14.00	$19.00	$23.00	$23.00	$12.00
Brooklyn	Brooklyn College	Hugh L. Carey Tunnel	$13.10	$22.10	$23.10	$20.55	$19.00	$23.00	$23.00	$25.10
		Brooklyn Bridge	$0	$9.00	$10.00	$14.00	$19.00	$23.00	$23.00	$12.00
Queens	Rego Park	Queens Midtown Tunnel	$13.10	$22.10	$23.10	$20.55	$19.00	$23.00	$23.00	$25.10
		Brooklyn Bridge	$0	$9.00	$10.00	$14.00	$19.00	$23.00	$23.00	$12.00
Staten Island	New Dorp[3]	VNB + Hugh L. Carey Tunnel	[0]	[2 0]	[2 0]	[2 0]	[2 0]	[2 0]	[2 0]	[30 0]
		VNB + Brooklyn Bridge	[0]	[0]	[0]	[0]	[2 0]	[2 0]	[2 0]	[0]
Suffolk	Central Islip	Queens Midtown Tunnel	$13.10	$22.10	$23.10	$20.55	$19.00	$23.00	$23.00	$25.10
		Brooklyn Bridge	$0	$9.00	$10.00	$14.00	$19.00	$23.00	$23.00	$12.00
Rockland	Spring Valley	George Washington Bridge	$13.75	$22.75	$23.75	$27.75	$32.75	$36.75	$23.65	$25.75
		MCB[4] + Willis Ave Bridge	$3.45	$12.45	$13.45	$17.45	$22.45	$26.45	$26.45	$15.45
Westchester	Croton-on-Hudson	Henry Hudson Bridge	$6.00	$15.00	$16.00	$20.00	$25.00	$29.00	$23.00	$18.00
		Willis Ave Bridge	$0	$9.00	$10.00	$14.00	$19.00	$23.00	$23.00	$12.00
Putnam	Brewster	Robert F Kennedy Bridge	$13.10	$22.10	$23.10	$27.10	$32.10	$36.10	$23.00	$25.10
		Willis Ave Bridge	$0	$9.00	$10.00	$14.00	$19.00	$23.00	$23.00	$12.00
Bergen	Ridgewood	George Washington Bridge	$13.75	$22.75	$23.75	$27.75	$32.75	$36.75	$23.65	$25.75
		Lincoln or Holland Tunnel	$13.75	$22.75	$23.75	$21.20	$19.65	$23.65	$23.65	$25.75
Essex	Nutley	Lincoln or Holland Tunnel	$13.75	$22.75	$23.75	$21.20	$19.65	$23.65	$23.65	$25.75
Mercer	Princeton	OB + VNB + HCT[5]	$39.95	$48.95	$49.95	$47.40	$45.85	$49.85	$49.85	$51.95
		NJ Turnpike + Holland Tunnel	$23.08	$32.08	$33.08	$30.53	$28.98	$32.98	$32.98	$35.08
Fairfield	Fairfield	Robert F Kennedy Bridge	$13.10	$22.10	$23.10	$27.10	$32.10	$36.10	$23.00	$25.10
		Willis Ave Bridge	$0	$9.00	$10.00	$14.00	$19.00	$23.00	$23.00	$12.00

Sources: TBTA, PANYNJ, NYSTA, Google Maps

1 A typical driving route was obtained by reviewing recommended directions from Google Maps for both toll and non-toll choices, where available.

2 Toll rates as of July 2022.

3 *[Driving cost from Staten Island assumes Verrazzano-Narrows Bridge tolls are $2.75 each way, which is consistent with the effective toll rate in MTA's Staten Island Resident Rebate Program.]*

(4) MCB–Mario Cuomo Bridge. At the Mario Cuomo Bridge, the commuter E-ZPass cost of $3.45 is used here. The resident cost is $4.75; standard E-ZPass is $5.75; and out of state E-ZPass pays $6.61

(5) OBX-Outerbridge Crossing; VNB–Verrazzano Narrows Bridge; HCT–Hugh L. Carey Tunnel.

BROOKLYN BRIDGE AND HUGH L. CAREY TUNNEL

The Brooklyn Bridge and Hugh L. Carey Tunnel would provide access across the East River to and from the FDR Drive and the West Side Highway/Route 9A that would not be subject to the Manhattan CBD toll. The Battery Park Underpass is not tolled and would not be tolled in the future, and therefore offers an untolled connection between the FDR Drive and the West Side Highway/Route 9A around the southern edge of Manhattan.

These Manhattan CBD toll exemptions for the Hugh L. Carey Tunnel ramps to the West Side Highway/Route 9A and Brooklyn Bridge ramps to the FDR Drive would provide a toll-free route around the Manhattan CBD to and from Brooklyn. Traffic from the Hugh L. Carey Tunnel and Brooklyn Bridge directly accessing Manhattan CBD streets would pay the Manhattan CBD toll. For all tolling scenarios, the total number of vehicles using the Brooklyn Bridge toward Manhattan would decrease, but volumes on the ramp connecting Manhattan-bound bridge traffic to the FDR Drive would increase (**Table 4A-20**). Tolling scenarios that provide crossing credits on TBTA facilities into the Manhattan CBD would subdue these increases, because crossing credits would increase the relative attractiveness of using TBTA tunnels.

Table 4A-20. Brooklyn Bridge Average Weekday Vehicle Volumes (Manhattan-Bound): No Action Alternative and Tolling Scenarios

DIRECTION	NO ACTION	SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
Manhattan-Bound								
Main Span	58,976	55,180	54,883	50,181	45,361	44,995	44,691	55,096
Ramp to FDR Drive	39,415	44,690	44,718	44,293	42,337	42,155	41,830	45,270
Ramps to Manhattan CBD	19,164	10,091	9,767	5,491	2,626	2,442	2,463	9,428
Manhattan-Bound (Difference from No Action Alternative)								
Main Span	—	-3,796	-4,093	-8,795	-13,615	-13,981	-14,285	-3,880
Ramp to FDR Drive	—	5,275	5,303	4,878	2,922	2,740	2,415	5,855
Ramps to Manhattan CBD	—	-9,073	-9,397	-13,673	-16,538	-16,722	-16,701	-9,736

Note: Volumes in this table are results directly from the BPM. **Subchapter 4B, "Transportation: Highways and Local Intersections,"** includes more detailed traffic engineering analysis with additional bridge capacity and operational restrictions, which are beyond the scope of regional analysis considered by the BPM.

Manhattan-bound volumes in the Hugh L. Carey Tunnel would increase for all tolling scenarios. For Tolling Scenario A and Tolling Scenario B, volume increases would result from increased demand to West Street and the FDR Drive via the Battery Park Underpass (**Table 4A-21**). This connection would not be subject to the Manhattan CBD toll in any of the tolling scenarios. For Tolling Scenarios C, D, E and F, use of the tunnel would also increase in response to the crossing credits for the TBTA tunnel toll. In these tolling scenarios, the increase in traffic would be derived from travelers diverted by the advantage of Manhattan CBD crossing credits offered by using the Hugh L. Carey Tunnel to access the Manhattan CBD.

Table 4A-21. Hugh L. Carey Tunnel Average Weekday Vehicle Volumes (Manhattan-Bound): No Action Alternative and Tolling Scenarios

DIRECTION	NO ACTION	SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
Manhattan-Bound								
Volume	31,063	31,785	32,061	41,122	51,087	51,369	50,962	31,580
Manhattan-Bound (Difference from No Action Alternative)								
Volume	—	722	998	10,059	20,025	20,306	19,900	517

Note: Volumes in this table are results directly from the BPM. **Subchapter 4B, "Transportation: Highways and Local Intersections,"** includes more detailed traffic engineering analysis with additional tunnel capacity and operational restrictions, which are beyond the scope of regional analysis considered by the BPM.

TRUCK TRIPS

BPM analysis of truck trips assumed that deliveries would still be made to restaurants, businesses, and residents regardless of Project implementation. The BPM assumed that trip origins and destinations of trucks and other commercial vehicles would remain consistent across all the tolling scenarios. As a result, all modeled reductions in trucks into the Manhattan CBD would result from through-trips diverting around the Manhattan CBD, balancing increased cost to access the Manhattan CBD and increased travel times to avoid the Manhattan CBD. The BPM analysis also assumed that trucks would use only valid truck routes.

The model estimates a reduction in trucks through the Manhattan CBD ranging from approximately 1,700 trucks in Tolling Scenario G to nearly 6,800 trucks in Tolling Scenario F compared to the No Action Alternative (**Table 4A-22**). Tolling Scenario F would have the highest tolls for trucks entering the Manhattan CBD.

Table 4A-22. Average Daily Truck Trips through the Manhattan CBD: No Action Alternative and Tolling Scenarios

	NO ACTION	SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
Truck Trips Through Manhattan CBD	8,392	3,746	3,424	3,139	2,705	1,788	1,607	6,657
Difference	—	-4,645	-4,967	-5,253	-5,687	-6,604	-6,784	-1,734

In addition to the BPM analysis, an assessment of truck travel changes from the congestion pricing programs in London and Stockholm were reviewed, along with findings from academic research on the propensity of shippers to switch toward overnight (or lower-toll period) deliveries once the Project is under way. Most importantly, the London and Stockholm post-implementation studies suggest that truck delivery companies continue to deliver their goods regardless of a congestion pricing program. Commercial stores still need their goods delivered. In some instances when reduced congestion in the core could improve travel times, some truck companies switched their deliveries into the peak period to deliver their goods.

For example, the congestion pricing program trial in Stockholm resulted in more truck deliveries in the middle of the day between commuting peak hours. Stockholm truck distribution companies were surveyed,

and feedback showed that companies felt positively about the program regarding reduced congestion and more efficient deliveries.[26]

Transport for London reported that approximately 10 percent of business sectors changed their policies on the timing of deliveries in response to the congestion pricing program. Like Stockholm, these temporal changes have resulted in truck companies either taking advantage of reduced congestion or avoiding congestion charges altogether.[27]

A report published in 2011[28] concludes that *[many]* truck delivery carriers are limited in their ability to change delivery times because receivers need to agree to overnight deliveries. Receivers ***[may prefer regular-hour deliveries because they typically have more staff on hand, as opposed to off-hour deliveries that could require additional staff, security, lighting, and other costs]***. Chapter 6, "Economic Conditions," *[Section 6.3.3.2,]* provides an analysis of the economic effects of the CBD Tolling Alternative on truck delivery companies and the receivers of their deliveries.

[For the Final EA, the Project Sponsors have added two new mitigation commitments to incentivize off-peak truck deliveries and reduce the number of trucks that divert around the Manhattan CBD: 1) a commitment to further reduce overnight toll rates; and 2) a commitment to expand NYCDOT's Off-Hours Delivery Program, a pilot program that provides support for businesses that shift their deliveries to off-peak periods.]

VEHICLE-MILES TRAVELED

Under all tolling scenarios, daily VMT would decline across the 28-county region, with the greatest declines occurring within the Manhattan CBD (see **Table 4A-7**). For the tolling scenarios analyzed, higher toll rates lead to more daily VMT reductions. Tolling scenarios with crossing credits temper daily VMT reductions in the Manhattan CBD, while leading to greater reductions outside of the Manhattan CBD. Within the Manhattan CBD Core, daily VMT would decline from 1.22 million in the No Action Alternative to between 1.14 million and 1.18 million (a decrease of between 2.8 percent and 6.2 percent). For the entire Manhattan CBD, daily VMT would decline from 3.24million in the No Action Alternative to between 2.95 million and 3.02 million (a decrease of between 9.2 percent and 7.1 percent). In 2023 for all tolling scenarios, the regional daily VMT would decline from 254.7 million to between 253.6 million and 254.2 million daily VMT (a decrease of between 0.4 percent and 0.2 percent).

Due to traffic diverting around Manhattan to avoid the Manhattan CBD toll, VMT would increase on Staten Island for all tolling scenarios and in the Bronx for Tolling Scenarios A, B, C, F, and G. **Table 4A-25 and Table 4A-27** present the quantity of these changes. Through the early outreach for the Project, the Project Sponsors heard from environmental justice communities that they would like a better understanding of the composition of vehicles that would be responsible for these VMT increases. Thus, **Table 4A-26** and

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26 Congestion Charge Secretariat, City of Stockholm. Facts and results from the Stockholm Trials. December 2006. http://www.planetizen.com/files/Final%20Report_The%20Stockholm%20Trial.pdf.

27 Transport for London. Impacts monitoring: Second Annual Report. April 2004. http://content.tfl.gov.uk/impacts-monitoring-report-2.pdf.

28 Holguín-Veras, José. (2011). Urban delivery industry response to cordon pricing, time-distance pricing, and carrier-receiver policies in competitive markets. Transportation Research Part A: Policy and Practice. Volume 45, Issue 8, 2011, pp. 802-824, ISSN 0965-8564, https://doi.org/10.1016/j.tra.2011.06.008.

Table 4A-28 provide the vehicle types related to these changes for Staten Island and the Bronx, respectively.

Some increases in VMT would occur within or near environmental justice communities. **Chapter 17, "Environmental Justice,"** discusses a broader description of these increases. However, VMT changes were tabulated for environmental justice and non-environmental justice communities and are presented in **Table 4A-23** and **Table 4A-24** for the various subareas of the region. A comparison of the two tables reveals the following:

- Within New York City, non-environmental justice areas would have slightly higher reductions in VMT in all but tolling scenario F compared to environmental justice areas.
- Within the Manhattan CBD core, environmental justice areas would have higher reductions in VMT for all tolling scenarios compared to non-environmental justice areas.
- Within NYC Subarea 1, environmental justice areas would have slightly lower reductions in VMT compared to non-environmental justice areas for Tolling Scenarios A, B, and G (tolling scenarios without crossing credits) and slightly higher reductions in VMT compared to non-environmental justice areas for Tolling Scenarios C, D, E, and F (tolling scenarios with crossing credits).
- Within NYC Subarea 2, environmental justice areas would experience similar but slightly lower reductions in VMT compared to non-environmental justice areas, in all but Tolling Scenario F.
- Within NYC Subarea 3, environmental justice areas would experience slight reductions in VMT in Tolling Scenarios C, D, E, and F, while non-environmental justice areas would experience increases in VMT.
- For all New York counties, environmental justice areas would experience slightly higher reductions in VMT compared to non-environmental justice areas for Tolling Scenarios C, D, E, and F.

For all Long Island counties, environmental justice areas would experience similar or slightly higher reductions in VMT compared to non-environmental justice areas for all tolling scenarios. For all New Jersey and Connecticut counties, environmental justice areas would experience similar changes in VMT compared to non-environmental justice areas for all tolling scenarios.

MODE SHIFT TO TRANSIT

Some of the decline in auto access to the Manhattan CBD would translate to increases in transit trips. Transit trips (e.g., commuter rail, subway, bus, tram, and ferry) to the Manhattan CBD from outside the Manhattan CBD would increase between 1 percent and 2 percent, depending on the tolling scenario (see **Table 4A-8**). These transit trips represent an AM peak period (6:00 a.m. to 10:00 a.m.) increase of between 22,000 and 45,000 people each weekday. See **Subchapter 4C, "Transportation: Transit,"** for a more complete description of the changes in transit use.

Table 4A-23. Vehicle-Miles Traveled Percentage Changes by Tolling Scenario in Environmental Justice Census Tracts by Subarea (2023)

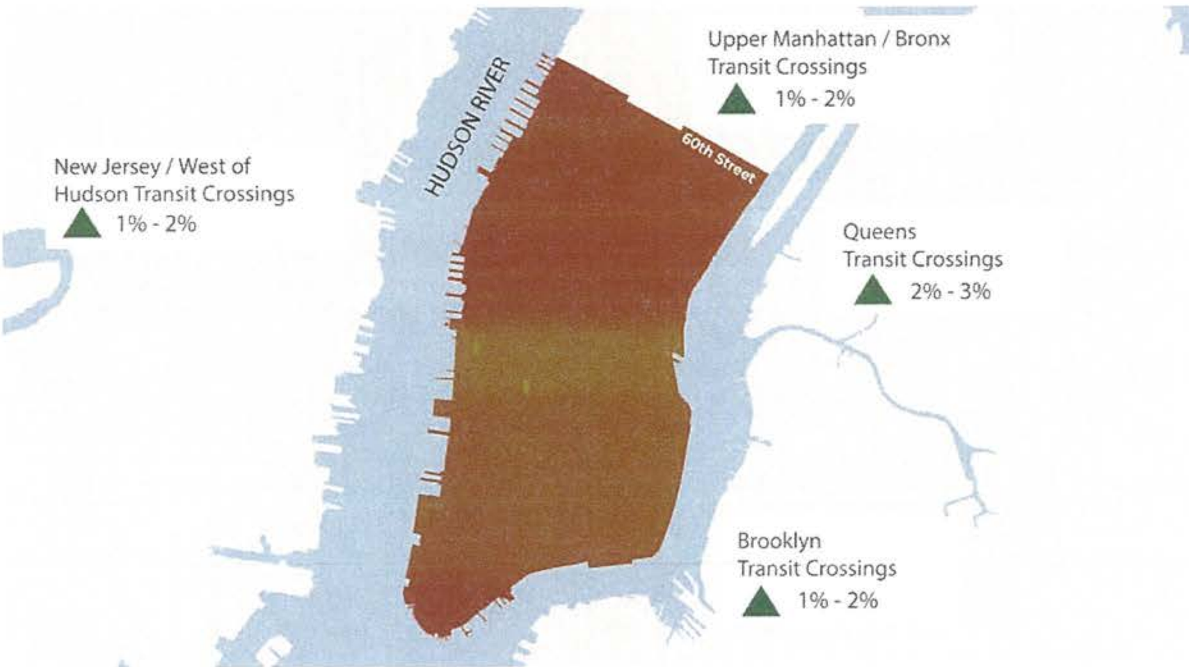
LOCATIONS	NO ACTION	SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
New York State	54,496,693	-0.3	-0.3	-0.7	-1.0	-1.1	-0.8	-0.4
New York City	30,852,557	-0.5%	-0.4%	-1.0%	-1.4%	-1.5%	-1.2%	-0.5%
Manhattan CBD	1,048,542	-8.0%	-7.8%	-11.1%	-15.6%	-16.2%	-14.4%	-8.7%
CBD Core	338,339	-10.3%	-10.1%	-12.3%	-15.5%	-16.7%	-14.3%	-11.4%
Peripheral Highways (south of 60th Street; excluded from the toll)	710,203	-6.9%	-6.7%	-10.6%	-15.6%	-15.9%	-14.4%	-7.4%
West Side Highway/Route 9A	181,790	-12.8%	-12.4%	-15.0%	-18.3%	-19.0%	-16.2%	-13.6%
FDR Drive	338,626	1.6%	2.2%	0.8%	-0.8%	-0.1%	1.1%	2.0%
Bridges Tunnels	189,787	-16.6%	-17.2%	-26.5%	-39.5%	-41.3%	-40.4%	-18.4%
NYC Subarea 1 (see Figure 4A-2)	871,420	-7.3%	-7.6%	-10.7%	-14.5%	-14.9%	-14.4%	-8.3%
NYC Subarea 2 (see Figure 4A-2)	3,992,349	-0.1%	0.0%	-0.7%	-1.5%	-1.6%	-1.2%	-0.2%
NYC Subarea 3 (see Figure 4A-2)	24,940,246	0.0%	0.1%	-0.3%	-0.3%	-0.4%	-0.2%	0.0%
Long Island Counties (2)	14,052,534	-0.1%	0.0%	-0.2%	-0.3%	-0.3%	-0.1%	-0.1%
New York Counties North of New York City (5)	9,591,602	-0.1%	-0.2%	-0.4%	-0.7%	-0.8%	-0.6%	-0.2%
New Jersey Counties (14)	42,703,264	0.0	0.0	0.2	0.2	0.1	0.2	0.0
Connecticut Counties (2)	8,274,823	-0.1	-0.1	-0.2	-0.2	-0.1	0.0	-0.2
TOTAL	105,474,780	-0.2	-0.2	-0.3	-0.5	-0.5	-0.3	-0.2

Table 4A-24. Vehicle-Miles Traveled Percentage Changes by Tolling Scenario in Non-Environmental Justice Census Tracts by Subarea (2023)

LOCATIONS	NO ACTION	SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
New York State	67,689,790	-0.4	-0.4	-0.6	-0.6	-0.7	-0.4	-0.5
New York City	16,279,182	-1.5%	-1.3%	-1.6%	-1.5%	-1.6%	-1.0%	-1.6%
Manhattan CBD	2,196,245	-7.6%	-7.5%	-6.6%	-5.4%	-5.9%	-3.6%	-8.3%
CBD Core	879,387	-3.6%	-3.5%	-1.7%	-0.7%	-1.5%	1.6%	-4.2%
Peripheral Highways (south of 60th Street; excluded from the toll)	1,316,858	-10.3%	-10.1%	-9.8%	-8.5%	-8.7%	-7.0%	-11.0%
West Side Highway/Route 9A	428,866	-17.8%	-17.3%	-21.0%	-21.5%	-20.9%	-18.6%	-17.9%
FDR Drive	382,055	-0.2%	0.4%	-1.2%	-3.2%	-2.6%	-0.8%	-0.1%
Bridges Tunnels	505,937	-11.5%	-12.0%	-6.9%	-1.5%	-3.1%	-1.9%	-13.4%
NYC Subarea 1 (see Figure 4A-2)	1,346,653	-7.8%	-7.6%	-9.0%	-10.1%	-10.7%	-9.7%	-8.5%
NYC Subarea 2 (see Figure 4A-2)	2,668,602	-1.2%	-1.1%	-1.7%	-0.9%	-1.1%	-0.6%	-1.4%
NYC Subarea 3 (see Figure 4A-2)	10,067,682	0.7%	0.8%	0.6%	0.4%	0.4%	0.5%	0.8%
Long Island Counties (2)	27,533,010	0.1%	0.0%	0.0%	-0.2%	-0.2%	0.1%	0.0%
New York Counties North of New York City (5)	23,877,598	-0.2%	-0.2%	-0.5%	-0.6%	-0.8%	-0.5%	-0.3%
New Jersey Counties (14)	54,874,836	0.0	0.0	0.2	0.2	0.1	0.2	0.1
Connecticut Counties (2)	26,635,047	-0.1	-0.2	-0.2	-0.2	-0.2	-0.1	-0.2
TOTAL	149,199,673	-0.2	-0.2	-0.2	-0.3	-0.3	-0.1	-0.2

While **Table 4A-8** shows a more aggregate change in transit activity, **Figure 4A-4** shows a more detailed picture of the changes in transit trips (crossings) into the Manhattan CBD from different locations outside of the Manhattan CBD. All tolling scenarios would lead to an increase in transit trips from each location shown in the map.

Figure 4A-4. Change in Transit Crossings into the Manhattan CBD



Source: BPM, range of results across all tolling scenarios

DIVERSIONS TO OTHER ROUTES

With the CBD Tolling Alternative, some people who previously traveled through the Manhattan CBD in vehicle or truck would choose a different path to avoid the Manhattan CBD altogether. For example, a person traveling by car from Caldwell, New Jersey, to Lincoln Center in Manhattan typically uses the Lincoln Tunnel between New Jersey and New York. Under some of the tolling scenarios, that same person would likely choose to reroute across the George Washington Bridge to avoid the Manhattan CBD toll. Between 72 percent and 82 percent of the total traffic reductions in the Manhattan CBD would be from through-trips finding other paths that do not include the Manhattan CBD.

In addition, some drivers who would continue to drive to the Manhattan CBD would choose a different route based on the introduction of Manhattan CBD crossing credits. In tolling scenarios with crossing credits, some drivers would choose more direct paths using free or reduced crossing credits when the cost of the toll is crossing-credited against their CBD toll, thereby minimizing the cost differential of traffic on East River crossings. **Subchapter 4B, "Transportation: Highways and Local Intersections,"** examines these specific highway- and intersection-based consequences and potential impacts of the CBD Tolling Alternative.

DIVERSION EFFECTS ON STATEN ISLAND

As a result of diversions, average daily traffic and congestion would increase in certain corridors outside of the Manhattan CBD. VMT, average daily traffic, and congestion in Staten Island would increase as a result of the CBD Tolling Alternative. This increase would be limited mostly to highways, with a minimum of change on local streets. In Staten Island, 92 percent of the total increase in VMT in Tolling Scenario A would be on highways (**Table 4A-25**). For tolling scenarios with crossing credits, the share of additional VMT on the highways in Staten Island would decline to 84 percent of the total increase.

On Staten Island highways, more than 90 percent of the increase in VMT would be caused by increased personal vehicle traffic, with the remaining percentage from commercial trucks in all tolling scenarios (**Table 4A-26**).

DIVERSION EFFECTS IN THE BRONX

As a result of diversions, average daily traffic and congestion would increase in certain corridors outside of the Manhattan CBD. In the Bronx, VMT would increase across Tolling Scenarios A, B, C, F, and G, with all the increase in VMT in the tolling scenarios occurring on highways (in each direction of travel) and ramps while local streets would have less VMT (**Table 4A-27**). In Tolling Scenarios A, B, C, F, and G, VMT in the Bronx would increase for personal vehicles, while VMT for commercial trucks would increase in all tolling scenarios except G (**Table 4A-28**).

During the public outreach phase of the Project, several commenters raised questions about the type and location of diversions in the Bronx, and particularly on the Cross Bronx Expressway, the Bruckner Expressway, and the Major Deegan Expressway. Additional analysis was conducted to address these questions, and it is presented here.

Increases in VMT in the Bronx would be driven largely by increases in VMT on the Cross Bronx Expressway between the Alexander Hamilton Bridge and the two Long Island Sound crossings (Whitestone and Throgs Neck Bridges). Personal vehicle VMT would comprise most of the VMT increases on the Cross Bronx Expressway, with commercial truck VMT contributing roughly 25 percent of the overall VMT increase in all tolling scenarios (**Table 4A-29**).

On Bronx highways other than the Cross Bronx Expressway, VMT would increase in Tolling Scenarios A, B, F, and G. All tolling scenarios with crossing credits would have lower VMT changes than Tolling Scenarios A and B, and Tolling Scenarios C, D, and E would have a decrease in VMT on other Bronx highways. (**Table 4A-31**).

Table 4A-25. Staten Island Daily Vehicle-Miles Traveled by Roadway Type (2023): No Action Alternative and Tolling Scenarios

	NO ACTION	SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
Staten Island Vehicle-Miles Traveled								
All Roads	3,986,457	4,071,056	4,078,180	4,078,984	4,076,004	4,085,745	4,080,603	4,098,571
Highways	1,954,370	2,032,359	2,037,322	2,038,405	2,031,673	2,040,204	2,033,669	2,052,174
Local Streets	1,848,897	1,851,808	1,853,295	1,853,460	1,856,424	1,857,188	1,859,385	1,858,658
Ramps	183,191	186,890	187,563	187,119	187,907	188,354	187,549	187,739
Staten Island Vehicle-Miles Traveled (Difference from No Action Alternative)								
All Roads	—	84,598	91,723	92,526	89,547	99,288	94,145	112,113
Highways	—	77,988	82,952	84,035	77,303	85,834	79,299	97,804
Local Streets	—	2,911	4,398	4,563	7,527	8,291	10,488	9,762
Ramps	—	3,699	4,372	3,928	4,716	5,163	4,358	4,548

Table 4A-26. Staten Island Daily Vehicle-Miles Traveled on Highways by Vehicle Type (2023): No Action Alternative and Tolling Scenarios

	NO ACTION	SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
Staten Island Highway Vehicle-Miles Traveled								
Personal Vehicle	1,784,013	1,863,248	1,866,725	1,867,229	1,859,509	1,867,296	1,862,611	1,885,233
Taxi/FHV/ Commercial Van	54,327	49,048	49,105	49,358	50,283	48,622	49,341	49,767
Commercial Truck	110,041	114,074	115,505	115,830	115,893	118,298	115,729	111,186
Bus	5,988	5,988	5,988	5,988	5,988	5,988	5,988	5,988
Staten Island Highway Vehicle-Miles Traveled (Difference from No Action Alternative)								
Personal Vehicle	—	79,235	82,711	83,216	75,496	83,283	78,598	101,220
Taxi/FHV/ Commercial Van	—	-5,279	-5,223	-4,969	-4,044	-5,705	-4,986	-4,560
Commercial Truck	—	4,033	5,464	5,789	5,852	8,257	5,687	1,144
Bus	—							

* In the BPM, all buses (e.g., MTA NYCT, MTA Bus Company, NJ TRANSIT and private operators) were considered insensitive to Manhattan CBD tolling, because such buses were assigned a fixed route and headway based on existing or planned service. Transit vehicles in the model were not allowed to deviate from those routes or headways based on tolls or congestion. Therefore, bus volumes are the same across tolling scenarios.

Table 4A-27. Bronx Daily Vehicle-Miles Traveled by Roadway Type (2023): No Action Alternative and Tolling Scenarios

	NO ACTION	SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
Bronx Vehicle-Miles Traveled								
All Roads	7,489,634	7,512,109	7,508,943	7,491,356	7,479,948	7,465,870	7,495,104	7,497,337
Highways	4,941,832	4,965,292	4,965,119	4,950,635	4,941,795	4,934,194	4,953,800	4,956,677
Local Streets	2,017,196	2,012,399	2,010,155	2,008,325	2,006,281	2,001,172	2,007,692	2,006,147
Ramps	530,606	534,418	533,668	532,397	531,872	530,504	533,613	534,513
Bronx Vehicle-Miles Traveled (Difference from No Action Alternative)								
All Roads	—	22,475	19,308	1,722	-9,686	-23,764	5,470	7,703
Highways	—	23,460	23,287	8,803	-38	-7,638	11,967	14,844
Local Streets	—	-4,797	-7,041	-8,872	-10,915	-16,024	-9,504	-11,049
Ramps	—	3,812	3,063	1,791	1,266	-102	3,007	3,907

Table 4A-28. Bronx Daily Vehicle-Miles Traveled on Highways by Vehicle Type (2023): No Action Alternative and Tolling Scenarios

	NO ACTION	SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
Bronx Highway Vehicle-Miles Traveled								
Personal Vehicle	4,275,956	4,298,318	4,294,704	4,282,357	4,275,223	4,264,603	4,282,572	4,296,317
Taxi/FHV/ Commercial Van	249,631	242,846	245,607	245,673	243,385	247,686	249,576	244,131
Commercial Truck	405,597	413,481	414,161	411,957	412,540	411,258	411,005	405,582
Bus	10,647	10,647	10,647	10,647	10,647	10,647	10,647	10,647
Bronx Highway Vehicle-Miles Traveled (Difference from No Action Alternative)								
Personal Vehicle	—	22,362	18,748	6,401	-734	-11,354	6,616	20,360
Taxi/FHV/ Commercial Van	—	-6,786	-4,024	-3,958	-6,246	-1,945	-56	-5,500
Commercial Truck	—	7,884	8,564	6,360	6,942	5,660	5,407	-16
Bus	—							

* In the BPM, all buses (e.g., MTA NYCT, MTA Bus Company, NJ TRANSIT and private operators) were considered insensitive to Manhattan CBD tolling, because such buses were assigned a fixed route and headway based on existing or planned service. Transit vehicles in the model were not allowed to deviate from those routes or headways based on tolls or congestion. Therefore, bus volumes are the same across tolling scenarios.

Table 4A-29. Cross-Bronx Daily Vehicle-Miles Traveled by Vehicle Type (2023): No Action Alternative and Tolling Scenarios

	NO ACTION	SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
Bronx Highway Vehicle-Miles Traveled								
Personal Vehicle	562,113	573,862	571,858	570,545	567,198	569,538	567,172	574,355
Taxi/FHV/ Commercial Van	35,574	35,752	36,516	36,513	36,928	37,472	37,117	36,352
Commercial Truck	100,673	102,559	102,661	101,775	102,333	101,447	102,642	100,226
Bus	58	58	58	58	58	58	58	58
TOTAL	698,418	712,232	711,093	708,892	706,518	708,515	706,989	710,991
Bronx Highway Vehicle-Miles Traveled (Difference from No Action Alternative)								
Personal Vehicle	—	11,749	9,746	8,433	5,086	7,426	5,059	12,242
Taxi/FHV/ Commercial Van	—	179	942	939	1,354	1,898	1,543	778
Commercial Truck	—	1,886	1,988	1,102	1,660	774	1,969	-447
Bus	—							
TOTAL	—	13,814	12,675	10,474	8,100	10,097	8,571	12,573

* In the BPM, all buses (e.g., MTA NYCT, MTA Bus Company, NJ TRANSIT and private operators) were considered insensitive to Manhattan CBD tolling, because such buses were assigned a fixed route and headway based on existing or planned service. Transit vehicles in the model were not allowed to deviate from those routes or headways based on tolls or congestion. Therefore, bus volumes are the same across tolling scenarios.

Finally, several comments were made regarding traffic and VMT increases on the three primary highways in the South Bronx—the Cross Bronx Expressway, Major Deegan Expressway, and Bruckner Expressway. The increases on the Cross Bronx Expressway are covered earlier in this section. The Major Deegan Expressway and Bruckner Expressway would both have lower VMT in all the tolling scenarios compared to the No Action Alternative. With the number of vehicles entering the Manhattan CBD decreasing, fewer drivers would use these two highways to access the CBD thus reducing VMT on these two highways (**Table 4A-32**).This is consistent as well with an overall decline in driving on local streets within the Bronx (**Table 4A-27**).

During early public outreach, concern was raised regarding the incremental increase in truck traffic, specifically, over the Cross Bronx Expressway. Additional analysis was done to provide more insight into the number of trucks that would divert. As a result of that analysis, Tolling Scenario G was added to this EA to demonstrate how that number could be reduced through the toll structure. **Table 4A-30** shows the volume of trucks on the Cross Bronx Expressway at Macombs Road, a location with a particularly high increase in daily truck volume. Analysis of the reason behind the truck volume increases revealed that long-distance trucks that previously passed through the Manhattan CBD would switch to the Cross Bronx Expressway in large numbers in Tolling Scenarios A through F. The significant reduction in additional trucks in Tolling Scenario G would result from reducing the truck toll to match the passenger vehicle toll.

Table 4A-30. Cross-Bronx Daily Truck Volume Changes (2023): No Action Alternative and Tolling Scenarios

	NO ACTION	SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
Cross Bronx Expressway Daily Truck Volume at Macombs Road								
Commercial Trucks	27,592	28,100	28,296	27,762	28,102	27,970	28,128	27,642
Cross Bronx Expressway Daily Truck Volume at Macombs Road (Difference from No Action Alternative)								
Commercial Trucks	—	509	704	170	510	378	536	50

Source: WSP, BPM

Table 4A-31. Bronx Highways excluding Cross Bronx Expressway Daily Vehicle-Miles Traveled by Vehicle Type (2023): No Action Alternative and Tolling Scenarios

	NO ACTION	SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
Bronx Highway Vehicle-Miles Traveled								
Personal Vehicle	3,713,844	3,724,456	3,722,846	3,711,812	3,708,024	3,695,064	3,715,400	3,721,962
Taxi/FHV/ Commercial Van	214,057	207,093	209,091	209,160	206,457	210,215	212,459	207,780
Commercial Truck	304,924	310,922	311,500	310,182	310,207	309,811	308,362	305,356
Bus	10,589	10,589	10,589	10,589	10,589	10,589	10,589	10,589
TOTAL	4,243,414	4,253,061	4,254,026	4,241,743	4,235,277	4,225,679	4,246,811	4,245,687
Bronx Highway Vehicle-Miles Traveled (Difference from No Action Alternative)								
Personal Vehicle	—	10,613	9,002	-2,032	-5,819	-18,779	1,557	8,118
Taxi/FHV/ Commercial Van	—	-6,964	-4,966	-4,897	-7,601	-3,843	-1,598	-6,278
Commercial Truck	—	5,998	6,576	5,257	5,283	4,887	3,438	431
Bus	—							
TOTAL	—	9,646	10,612	-1,671	-8,137	-17,735	3,396	2,271

* In the BPM, all buses (e.g., Metropolitan Transportation Agency [MTA] New York City Transit, MTA Bus Company, NJ TRANSIT and private operators) were considered insensitive to Manhattan CBD tolling, because such buses were assigned a fixed route and headway based on existing or planned service. Transit vehicles in the model were not allowed to deviate from those routes or headways based on tolls or congestion. Therefore, bus volumes are the same across tolling scenarios.

Table 4A-32. Select Bronx Highways Daily Vehicle-Miles Traveled by Vehicle Type (2023): No Action Alternative and Tolling Scenarios

	NO ACTION	SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
Select Bronx Highways Vehicle-Miles Traveled								
Major Deegan Freeway	1,119,278	1,115,360	1,114,715	1,106,730	1,105,357	1,103,220	1,111,200	1,113,208
Bruckner Expressway	476,409	472,256	476,060	472,911	467,568	465,258	471,241	472,443
Select Bronx Highway Vehicle-Miles Traveled (Difference from No Action Alternative)								
Major Deegan Freeway	—	-3,918	-4,563	-12,548	-13,921	-16,058	-8,078	-6,070
Bruckner Expressway	—	-4,154	-349	-3,499	-8,842	-11,151	-5,169	-3,966

TRIP SUPPRESSION

Trip suppression is a trip to the Manhattan CBD that would be "canceled" as a result of the Project. The trip would either no longer take place or divert to a different destination outside of the Manhattan CBD. These types of trips are different from trips that switch modes from driving to transit as discussed earlier in this chapter. The BPM includes explicit representations of destination change and mode choice; however, the BPM has a limited accounting for the third and smallest type of trip suppression (i.e., trip cancellation).

It is anticipated that some trips would be canceled due to the implementation of the Project based on similar program implementations in London and Stockholm. In those implementations, there is a strong relationship between trip cancellation and congestion pricing programs, although the available data varies between London and Stockholm. Of the available data, the trends in London and Stockholm similarly show that the implementation of congestion pricing programs are effective in reducing car traffic and suppressing trips to a CBD. After one year of implementing congestion pricing in Central London in February 2003, the number of vehicles entering the Central London CBD charging zone decreased by 18 percent, and there was an average daily decrease of approximately 60,000 trips made to the Central London CBD. Of these 60,000 trips, approximately 50 percent switched to public transit, approximately 20 percent of trips avoided the Central London CBD charging zone, roughly 15 percent switched to car share, and the remaining 15 percent of trips were assumed to be suppressed. In 2020, the program charged a flat weekday fee of £15 (around $20.25) when entering the zone between 7:00 a.m. and 10:00 p.m.

Similarly, after a six-month trial, Stockholm saw a 22 percent decrease in car traffic entering the Stockholm CBD charging zone between 2005 and 2006. Less than 50 percent of car users who stopped commuting into the Stockholm CBD charging zone switched to transit. It can be inferred that the remaining 50 percent or so of trips that were no longer made to the Stockholm CBD were suppressed, transferred to car share, routed elsewhere outside the Stockholm CBD, or switched to take place outside of tolling hours. The Stockholm CBD charges were effective weekdays from 6:30 a.m. to 6:30 p.m., and the price was set at 10 SEK to 20 SEK (US $1.33 to $2.67 at 2006 rates) for off-peak and peak periods.

TAXIS AND FHVS

The tolling scenarios test a variety of tolling policies for taxis and FHVs ranging from charging a toll each time a taxi or FHV enters the Manhattan CBD to a complete exemption from paying the CBD toll. **Table 4A-33** provides an overview of the CBD tolling policy for taxis and FHVs in each tolling scenario. The CBD tolls would be collected in addition to the New York State Congestion Surcharge[29] of $2.50 and $2.75 for taxis and FHVs, respectively, for trips that start, end, or pass through the congestion surcharge zone—Manhattan south of 96th Street.

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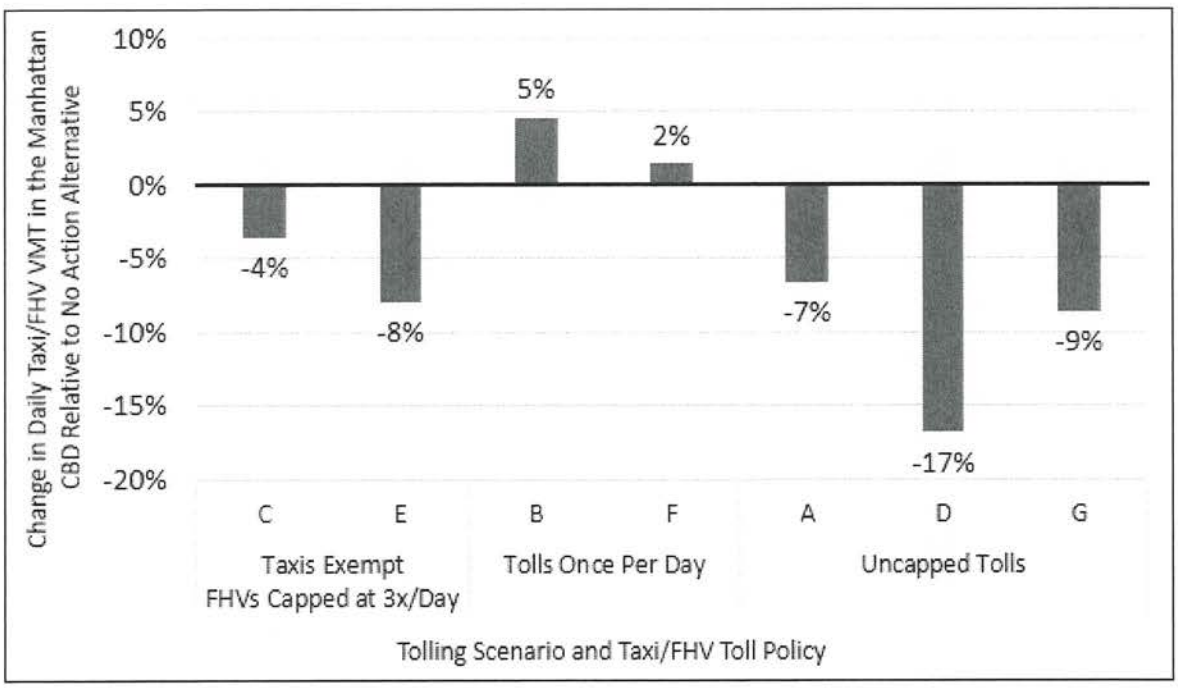
[29] Congestion Surcharge. New York City Taxi & Limousine Commission. December 25, 2021. https://www1.nyc.gov/site/tlc/about/congestion-surcharge.page.

Table 4A-33. Taxi and FHV Manhattan CBD Tolling Policy

TOLLING POLICY	SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
Taxi Manhattan CBD Toll Policy	All Entries	Once per Day	Exempt	All Entries	Exempt	Once per Day	All Entries
FHV Manhattan CBD Toll Policy	All Entries	Once per Day	Up to 3x a Day	All Entries	Up to 3x a Day	Once per Day	All Entries

The CBD tolling policy for taxis and FHVs when combined with varying CBD toll rates would change demand for taxis and FHVs into, out of, and within the Manhattan CBD. **Figure 4A-5** demonstrates how the different tolling policies would affect taxi and FHV VMT. Exemptions and caps decrease the toll burden on taxi/FHV drivers, while increasing the toll rate for other drivers to meet the Project's congestion and revenue objectives. If taxis and FHVs are charged for each trip, the demand for their service would decline, particularly in New York City, reducing trips and better meeting the Project objectives, but creating new direct costs and/or potential job insecurity.

Figure 4A-5. Changes in Daily Taxi/FHV VMT in the Manhattan CBD, CBD Tolling Alternative Tolling Scenarios Compared to the No Action Alternative



Source: Best Practice Model, WSP 2021

Additional Analyses of Taxis and FHVs

In response to concerns expressed during the public outreach process with respect to the anticipated effects of the Project on both taxi and FHV drivers, additional analyses were conducted. Specifically, analyses were done to assess the revenue and traffic effects of implementing Tolling Scenarios A and D with a cap of once per day for taxis and FHVs (like Tolling Scenarios B and F) and implementing Tolling

Scenario D with both taxis and FHVs exempt from the toll. In the following tolling scenarios, the revenue objectives of the Project would be maintained. The results of these analyses are presented as follows:

- **Tolling Scenario A with Taxis/FHVs Capped at Once Per Day.** The estimated value of implementing a cap on taxis and FHVs so that these vehicles would be charged once each day is $100 million in forgone net annual revenue under the tolling rates used in Tolling Scenario A. The cap would result in about 20 percent more taxis and FHVs entering the Manhattan CBD as compared to the original Tolling Scenario A presented earlier in this subchapter. To still meet the congestion and revenue objective of the Project, tolls would need to be raised 10 percent to 15 percent on all vehicle classes in Tolling Scenario A to offset forgone taxi and FHV revenues. This would further reduce personal vehicles and trucks at the Manhattan CBD boundary by 2 percent to 3 percent compared to Tolling Scenario A. However, the decline in personal vehicles and trucks would be mostly offset by the increase in taxis and FHVs entering the Manhattan CBD. As a result, the volumes of all vehicles entering the Manhattan CBD would not change in aggregate.
- **Tolling Scenario D with Taxis/FHVs Capped at Once Per Day.** The estimated value of implementing a cap on taxis and FHVs so that these vehicles would be charged once each day is $150 million to $180 million in forgone net annual revenue under the tolling rates used in Tolling Scenario D. The cap would result in about 25 percent more taxis and FHVs entering the Manhattan CBD compared to the existing Tolling Scenario D. Tolling Scenario D—as presented originally with uncapped tolling of taxis and FHVs—would exceed the annual net revenue objectives of the Project by over $300 million. Thus, it is reasonably expected that a cap on taxis and FHVs so that these vehicles would be charged once each day could be accommodated without needing to raise toll rates presented in Tolling Scenario D.
- **Tolling Scenario D with Taxi/FHV Tolling Exemption.** The estimated value of a taxi and FHV toll exemption is $200 million to $250 million in forgone net annual revenue under the tolling rates used in Tolling Scenario D. Exempting taxis and FHVs from the CBD toll would increase the number of additional taxis and FHVs entering the Manhattan CBD by up to 50 percent compared to the existing Tolling Scenario D. Tolling Scenario D—as presented originally with no exemptions for taxis and FHVs—would exceed the annual net revenue objectives of the Project by over $300 million. Thus, it is reasonably expected that including an exemption for taxis and FHVs so that these vehicles would not be charged could be accommodated without needing to raise toll rates presented in Tolling Scenario D.
- **Tolling Scenario G with Taxis/FHVs Capped at Once Per Day.** A variation of Tolling Scenario G was run to test the impact of adding a one-charge-per-day cap to taxis and FHVs. Adding this cap required increasing tolls on other vehicles by about 10 percent to meet the Project's revenue goal. This toll increase was low enough so as not to notably affect the results from Tolling Scenario G and, importantly, still addresses the concerns regarding commercial truck traffic in the South Bronx, though the number of trucks on the Cross Bronx Expressway at Macombs Road, would shift from 50 to 251, still lower than every other tolling scenario except Tolling Scenario C.

[For the Final EA, the Project Sponsors have committed to new mitigation to address the Project's potential effects on taxi and FHV drivers. Specifically, TBTA will ensure that a toll structure with tolls of no more than once per day for taxis or FHVs is included in the final CBD toll structure.]

"WHO PAYS" ANALYSIS

To better understand the distribution of toll revenue (burdens) and CBD trips (benefits) by geography, an analysis was conducted that quantified the share of revenues paid by drivers from different geographies versus the share of trips made to the Manhattan CBD from each of those same geographies. This analysis became known as "Who Pays." This was conducted using results from the 2023 BPM Tolling Scenarios A through G. **Table 4A-34** contains the results of this analysis. Each cell contains the percentage of total net revenue paid by drivers from a particular geography and the percentage of total trips to the Manhattan CBD made by drivers from that geography. For example, in Tolling Scenario A, Bronx drivers would pay 6.2 percent of total net revenue and would make 6.6 percent of total CBD vehicle trips.

The percentages of CBD toll revenue and trips shown in **Table 4A-34** tend to be more balanced for tolling scenarios that do not offer crossing credits (Tolling Scenarios A, B, and G), while the percentages tend to diverge for tolling scenarios that offer crossing credits (Tolling Scenarios C, D, E, and F).

Table 4A-34. Projected Percentage of Total Revenue/Percentage of Total Trips

GEOGRAPHY	SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
New York (Manhattan)	13.5% / 14.0%	13.0% / 13.5%	15.7% / 13.6%	19.6% / 12.5%	17.9% / 12.4%	20.0% / 12.5%	13.1% / 13.5%
Kings (Brooklyn)	19.0% / 17.9%	18.9% / 17.8%	20.3% / 18.7%	17.1% / 16.5%	17.1% / 16.7%	17.5% / 16.5%	19.1% / 18.0%
Queens	17.9% / 16.4%	18.1% / 16.6%	17.7% / 17.6%	15.8% / 16.4%	16.6% / 16.5%	16.4% / 16.1%	18.2% / 16.7%
Bronx	6.2% / 6.6%	6.2% / 6.7%	7.9% / 7.1%	9.9% / 6.6%	9.1% / 6.6%	10.2% / 6.6%	6.3% / 6.8%
Richmond (Staten Island)	1.6% / 1.6%	1.6% / 1.5%	1.7% / 1.8%	1.1% / 1.7%	1.4% / 1.8%	1.4% / 1.7%	1.6% / 1.6%
Long Island	7.6% / 6.8%	7.7% / 6.9%	7.2% / 7.0%	6.3% / 6.7%	6.8% / 6.8%	6.3% / 6.6%	7.7% / 6.9%
Hudson Valley	6.6% / 7.1%	6.6% / 7.2%	8.4% / 7.7%	10.4% / 7.1%	9.4% / 7.1%	10.8% / 7.2%	6.6% / 7.1%
New Jersey	17.7% / 20.0%	17.8% / 20.0%	11.6% / 16.5%	10.0% / 21.9%	11.8% / 21.4%	7.8% / 21.9%	17.5% / 19.6%
Connecticut	2.4% / 2.5%	2.4% / 2.6%	3.1% / 2.8%	4.0% / 2.6%	3.5% / 2.5%	4.1% / 2.6%	2.4% / 2.6%
Other	7.5% / 7.2%	7.5% / 7.3%	6.4% / 7.1%	5.8% / 8.1%	6.5% / 8.4%	5.5% / 8.3%	7.4% / 7.2%

Note: *Revenue* includes only projected CBD toll revenue. Other existing TBTA and PANYNJ tolls, including those on crossings leading directly to or from the Manhattan CBD, are not included in the revenue calculations.

4A.5 CONCLUSION

This subchapter describes the travel forecasts that were prepared for the opening year (2023) and horizon year (2045) for each of the seven tolling scenarios established to evaluate the CBD Tolling Alternative. (See **Chapter 2, "Project Alternatives,"** for more information on the tolling scenarios and how they vary by the value of the toll based on specific tolling actions such as exemptions, crossing credits, and daily toll caps.)

Overall, the BPM provides a baseline representation of the complicated, dense, and congested transportation network that serves the New York City region. The model forecast results show that compared to the No Action Alternative, the CBD Tolling Alternative would meet the purpose and need and established goals for congestion relief in the Manhattan CBD and raise revenue to support transit capital improvements. This section identifies and summarizes general effects on travel patterns from implementing the Project and describes high-level changes to travel and trip-making decisions as well as effects on the taxi/FHV industry.

4A.5.1 General Effects

All tolling scenarios would result in travel pattern changes that would support congestion relief such as reduced automobile and truck trips to the Manhattan CBD, reduced VMT to and within the Manhattan CBD and regionally, and a shift from auto trips to transit. Percentage reductions in 2023 vehicle trips entering the Manhattan CBD would range from 15.4 percent to 19.9 percent. These travel pattern changes are the basis for many of the impact evaluations found in subsequent chapters of this EA.

- **Transit**: The declines in auto-based trips to the Manhattan CBD would result in increases in transit trips. Transit trips (e.g., commuter rail, subway, bus, tram, and ferry) to the Manhattan CBD from outside the Manhattan CBD would increase between 1 percent and 2 percent, depending on the tolling scenario (see **Table 4A-8**).
- **VMT:** For the tolling scenarios analyzed, each tolling scenario would result in reductions in VMT in the Manhattan CBD, as well as across the region (see **Table 4A-7**). Each tolling scenario has a different combination of toll rates, crossing credits, and exemptions that combined would reduce daily VMT between 7.1 percent and 9.2 percent in the Manhattan CBD. Crossing credits temper daily VMT reductions in the CBD, while leading to greater reductions outside of the CBD. Patterns of VMT changes would be consistent across the region with similar changes in areas identified as environmental justice and non-environmental justice communities.
- **Travel Times**: While the Project would improve travel times to the Manhattan CBD, some areas would experience longer auto travel times to the Manhattan CBD from increases in diversionary trips to avoid the Manhattan CBD via highways in the Bronx and Staten Island.

4A.5.2 Crossing Credits

Four of the seven analyzed tolling scenarios offer a range of crossing credits to vehicles that pay tolls on TBTA and PANYNJ bridges and tunnels. While the location and amount of the crossing credits differ in those tolling scenarios,[30] common general effects include the following:

- Some drivers who continue to drive to the Manhattan CBD would choose a different route based on the introduction of Manhattan CBD crossing credits.
- Crossing credits would increase the attractiveness of TBTA East River facilities (Hugh L. Carey Tunnel, Queens-Midtown Tunnel, and the Robert F. Kennedy Bridge) compared to existing free bridges. The travel model indicates that increased demand for these routes has the effect of increasing auto and truck travel times from much of Long Island to the Manhattan CBD market due to additional congestion in the Queens-Midtown Tunnel. While these effects are observed in the four tolling scenarios that would provide crossing credits, they are less prevalent in the three tolling scenarios that would not provide crossing credits. With crossing credits in place, there are certain travel markets where travel times and congestion could increase due to the Project, while other travel markets could see less congestion compared to tolling scenarios without crossing credits.
- For the Hudson River crossings in three of the tolling scenarios, some drivers bound to the Manhattan CBD from west of the Hudson River would divert to the Lincoln Tunnel and Holland Tunnel based on the availability of crossing credits to offset existing tolls as part of the total vehicle cost with Manhattan CBD tolling. As a result, volumes on the George Washington Bridge to Manhattan would decline; however, this decline is reversed in the tolling scenario that offers crossing credits to George Washington Bridge users.
- Tolling scenarios with crossing credits lead to lower VMT in environmental justice communities than tolling scenarios without crossing credits.

4A.5.3 Diversions/Toll Avoidance

Every tolling scenario would cause diversions of traffic by drivers wishing to avoid or minimize the tolls paid. The particular diversions for different travel markets are explained in more detail in this chapter, but important themes are:

- Modeling of the CBD Tolling Alternative indicates that passenger auto trips (i.e., not truckers) have three basic ways to avoid paying the CBD toll:
  - Choose a new and different path to avoid the CBD toll.
  - Switch to another mode such as transit.
  - Choose not to make the trip to the Manhattan CBD.

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30 Credits offered in tolling scenarios are described in **Chapter 2, "Project Alternatives,"** as well as in the narrative descriptions of the tolling scenarios found in **"Appendix 4A.2, Transportation: Travel Forecast Tolling Scenario Summaries and Detailed Tables (2023 and 2045)."**

- For trucks, only through-traveling trucks that do not stop in the Manhattan CBD can avoid tolling by switching paths. The modeling of CBD tolling scenarios indicates that the level of tolls imposed on trucks would have an impact on the amount of diverted truck traffic seen outside the Manhattan CBD.
- Trucks of different sizes exhibit different diversion behavior. Because through-traveling small and medium trucks have access to all bridges and tunnels, their potential to divert to non-Manhattan CBD routes is greater than through-traveling large trucks, which face prohibitions and height restrictions in certain tunnels and roadways.

4A.5.4 Taxis and FHVs

Taxis and FHVs are an important part of the CBD transportation network; in addition, taxi and FHV drivers largely identify as minority populations and are therefore an environmental justice population. The CBD tolling policy for taxis and FHVs when combined with varying CBD toll rates would change demand for taxis and FHVs into, out of, and within the Manhattan CBD. In every tolling scenario, taxi and FHV journeys into, out of, or within the Manhattan CBD would decrease between 1 percent and 22 percent. When the taxi and FHV toll is charged only once per day per vehicle, the cost would be spread across multiple trips and passengers during the day, with minimal effect on travel patterns, while taxi and FHV trips would decline the most in tolling scenarios that charge a toll for each entry into the Manhattan CBD.

4A.6 SUMMARY OF EFFECTS

Finally, **Table 4A-35** is provided to summarize the effects of the tolling scenarios across various topics. All tolling scenarios would reduce traffic volumes within the Manhattan CBD, but to varying degrees. Tolling Scenario D results in the greatest overall reduction in vehicle trips entering the Manhattan CBD because it has the greatest reduction in daily work trips by automobile. Tolling Scenario E results in the greatest reduction of truck trips traveling through the Manhattan CBD, while Tolling Scenario G minimizes the increase in truck trips diverting through the Bronx. Overall, the tolling scenarios result in a 7 percent to 9 percent reduction in VMT in the Manhattan CBD and less than 1 percent reduction in VMT elsewhere in the regional study area.

Table 4A-35. Summary of Effects of Tolling Scenarios on Regional Transportation Effects and Modeling

TOPIC	SUMMARY OF EFFECTS	LOCATION	DATA SHOWN IN TABLE	TOLLING SCENARIO A	B	C	D	E	F	G	POTENTIAL ADVERSE EFFECT	MITIGATION
Vehicle Volumes	▪ Decreases in daily vehicle trips to Manhattan CBD overall. ▪ Some diversions to different crossings to Manhattan CBD or around the Manhattan CBD altogether, depending on tolling scenario. As traffic, including truck trips, increase on some circumferential highways, simultaneously there is a reduction in traffic on other highway segments to the CBD. ▪ Diversions would increase or decrease traffic volumes at local intersections near the Manhattan CBD crossings.	Crossing locations to Manhattan CBD	% Increase or decrease in daily vehicles entering the Manhattan CBD relative to No Action Alternative	-15%	-16%	-17%	-19%	-20%	-18%	-17%	No	No mitigation needed. Beneficial effects
Auto Journeys to Manhattan CBD		Manhattan CBD	% increase or decrease in worker auto journeys to Manhattan CBD relative to No Action Alternative	-5%	-5%	-7%	-9%	-11%	-10%	-6%	No	No mitigation needed. Beneficial effects
			Absolute increase or decrease in worker auto journeys to Manhattan CBD relative to No Action Alternative	-12,571	-12,883	-17,408	-24,017	-27,471	-24,433	-14,578		
Truck Trips Through Manhattan CBD		Manhattan CBD	Increase or decrease in truck trips through Manhattan CBD relative to No Action Alternative	-4,645 (-55%)	[ ] (-59%)	-5,253 (-63%)	-5,687 (-68%)	-6,604 (-79%)	-6,784 (-81%)	[3] (-21%)	No	No mitigation needed. Beneficial effects

TOPIC	SUMMARY OF EFFECTS	LOCATION	DATA SHOWN IN TABLE	TOLLING SCENARIO A	B	C	D	E	F	G	POTENTIAL ADVERSE EFFECT	MITIGATION
Transit Journeys	▪ Overall decrease in vehicle-miles traveled (VMT) in the Manhattan CBD and region overall in all tolling scenarios and some shift from vehicle to transit mode.	Manhattan CBD	% Increase or decrease in daily Manhattan CBD-related transit journeys relative to No Action Alternative	1% to 3%							No	No mitigation needed. No adverse effects
Traffic Results		Manhattan CBD	% increase or decrease in daily VMT relative to No Action Alternative	-9% to -7%							No	No mitigation needed. Beneficial effects in Manhattan CBD, NYC (non-Manhattan CBD), north of NYC, and Connecticut; no adverse effects in Long Island and New Jersey
		NYC (non-Manhattan CBD)		-1 to 0%								
		New York north of NYC		-1% to 0%								
		Long Island		Less than (+) 0.2% change								
		New Jersey		Less than (+) 0.2% change								
		Connecticut		-0.2% to 0%								

4B. Highways and Local Intersections

This subchapter presents the highways and local intersections traffic assessment of the CBD Tolling Alternative for the 2023 analysis year.[1] This subchapter provides an overview of the regional highway network and evaluates the potential traffic effects of the CBD Tolling Alternative on key highway segments accessing the Manhattan CBD and along circumferential highways. It also examines the potential change in traffic operations at local intersections that could increase or decrease volumes with the implementation of the CBD Tolling Alternative. Throughout the public outreach process, the potential effects of traffic changes at key locations, many of which are in or adjacent to environmental justice communities, was raised, and are discussed in this subchapter.

4B.1 INTRODUCTION

This subchapter focuses on regional highways at points where they would experience the greatest potential effect of shifts in travel and roadways near Manhattan CBD access points and circumferential routes that avoid the Manhattan CBD. The traffic on local roadways resulting from these shifts was analyzed at intersections, using accepted standards of level of service (LOS) and vehicle delay criteria as the basis for evaluating changes in traffic operations. While the MTA Reform and Traffic Mobility Act (Traffic Mobility Act) exempts the Project from any state or local environmental review, the methodology used for this analysis is based on the State Environmental Quality Review Act (SEQRA).[2]

To evaluate the potential effects of the Project on the highway system and local intersections the following steps were performed and documented in **Appendix 4B.1, "Transportation: Transportation and Traffic Methodology for NEPA Evaluation:"**

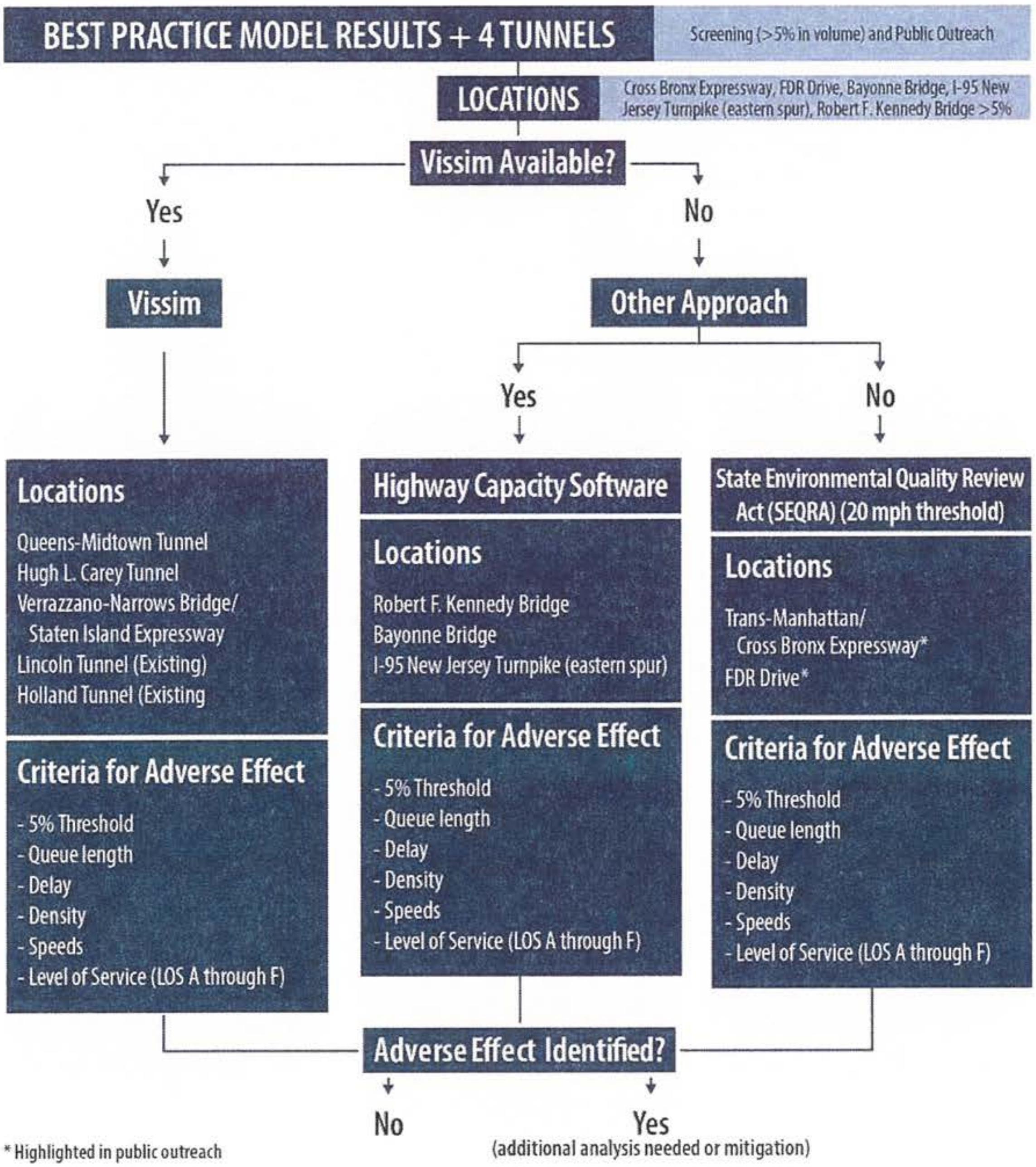
- Used the New York Metropolitan Transportation Council Best Practice Model (BPM) to model regional travel for the seven tolling scenarios, in addition to the No Action Alternative, to identify changes in regional travel demand and patterns (shift in modes and diversion of traffic).
- Assigned BPM traffic flows to the highway and street network for all tolling scenarios.
- Performed a screening analysis using the BPM for all tolling scenarios to identify additional highway segments, in addition to the four tunnels that connect to the Manhattan CBD, with a potential increase in traffic volumes greater than 5 percent. In consultation with the Project Sponsors, 10 highway corridors were analyzed for traffic operations using a using a traffic model or qualitative analyses as shown in **Figure 4B-1**.
- Determined the tolling scenario that would be representative of those with the highest potential to increase traffic along certain alternate routes and at local intersections (**Section 4B.4**).

1 A 2045 horizon year traffic analysis is not required for this Environmental Assessment because the CBD Tolling Alternative would be expected to have a similar effect on traffic in 2045 as the 2023 analysis year due to capacity constraints at the Manhattan CBD crossings, which resulted in very low growth in traffic. However, a 2045 regional transportation and air quality analyses were performed using the BPM in order to meet state and Federal regional conformity requirements.

2 Traffic analyses for intersections were also performed using the methodology in the *New York City Environmental Quality Review (CEQR) Technical Manual*. See **Appendix 4B.5, "Transportation: Traffic LOS CBD Tolling Alternative with Mitigation."**

- To determine whether there was an adverse effect, changes in queue length, delay times, density, speeds, and LOS were assessed (**Section 4B.4**).
- Performed an assessment of effects on roadways in Central Park (**Section 4B.5**).
- In consultations with NYCDOT, identified and analyzed 102 local intersections within and outside the Manhattan CBD, grouping them functionally into 15 local study areas to be assessed (**Section 4B.6**).

Figure 4B-1. Analytical Approach Diagram



Source: WSP, 2022.

Appendix 4B.1, "Transportation: Transportation and Traffic Methodology for NEPA Evaluation," documents the following steps taken to assess the effect of the CBD Tolling Alternative on local intersections:

- Calibrated Synchro traffic model to reflect baseline intersection counts and operations.
- Determined analysis hours.
- Established traffic volumes for the No Action Alternative.
- Screened traffic volumes for various tolling scenarios to identify representative incremental traffic volumes.
- Projected CBD Tolling Alternative incremental traffic volumes and total traffic at each intersection based on regional travel model forecasting and trip assignment.
- Projected potential delays and LOS at key intersections.
- Identified potentially affected study area intersections with potential increases in delays that would exceed SEQRA criteria.[3]
- Developed minor intersection improvements (e.g., signal-timing, striping) to be incorporated into the Project that would reduce delays at the potentially affected intersections and avoid adverse effects.

In both the highway corridors and at the intersection locations, if an adverse effect was found after additional analyses were performed, mitigation was developed.

4B.2 SUMMARY OF EFFECTS OF THE CBD TOLLING ALTERNATIVE TOLLING SCENARIOS AND DETERMINATION OF TOLLING SCENARIO WITH LARGEST INCREASE IN LOCAL TRAFFIC VOLUMES

As set forth in **Chapter 2, "Project Alternatives,"** the proposed CBD Tolling Alternative is being evaluated through a range of tolling scenarios reflecting variations in tolls and application of possible discounts, exemptions, and/or crossing credits that would reduce or eliminate the CBD tolls paid by certain motorists or vehicle classes but would result in generally higher tolls needed to offset potential loss in revenues. These discounts, exemptions, and crossing credits have the potential to alter travel behavior and travel patterns in a manner that could result in increased traffic at some locations, although overall traffic would be reduced for all tolling scenarios.

Tolling Scenario A has the lowest overall CBD tolls with no discounts, no exemptions, and no crossing credits (limited to only those identified in the Traffic Mobility Act). This tolling scenario, if adopted, would result in a reduction of traffic volumes at all Manhattan CBD crossings.

Tolling Scenarios B and C have higher CBD tolls but with some discounts, exemptions, and/or crossing credits. These tolling scenarios would generally reduce traffic; however, Tolling Scenario C, with partial crossing credits, has the potential for a modest shift in traffic from currently toll-free facilities to tolled facilities where the crossing credits would be applied. Tolling Scenario G is similar to Tolling Scenarios A

3 See **Appendix 4B.1, "Transportation: Transportation and Traffic Methodology for NEPA Evaluation,"** for a detailed discussion of the applicable SEQRA criteria used to determine the significance of adverse traffic effects.

and B, with lower toll costs for truck trips in the region. Tolling Scenario G would generally reduce traffic, and the lower truck toll rate would reduce truck diversions to circumferential routes around the Manhattan CBD.

Tolling Scenarios D, E, and F have the highest CBD tolls along with even higher discounts, exemptions, and/or crossing credits. These tolling scenarios would provide a full crossing credit at currently tolled facilities so that motorists would not have to pay both a facility toll and a CBD toll. This would equalize the effective tolls at all Manhattan CBD crossings and provide an incentive for some motorists currently using a toll-free facility (to avoid paying a toll) to shift to a currently tolled facility. The two facilities potentially most impacted by crossing credits are the Queens-Midtown Tunnel and the Hugh L. Carey Tunnel. The Queens-Midtown Tunnel would handle additional traffic volumes diverting primarily from the Ed Koch Queensboro Bridge, and the Hugh L. Carey Tunnel would handle additional traffic diverted from the Brooklyn Bridge and the Manhattan Bridge. The shift of traffic to the Hugh L. Carey Tunnel and the Queens-Midtown Tunnel has the potential of increasing traffic at these tunnels, along the highway approaches leading to the tunnels, and at nearby intersections adjacent to the tunnel portals. Under Tolling Scenarios C, D, and E, ***[there would be larger reductions in]*** regional vehicle miles traveled (VMT) than under Tolling Scenarios A, B, F, and G. However, for the Manhattan CBD, Tolling Scenarios D, E, and G would have the most ***[substantial]*** reductions in VMT.

All tolling scenarios would divert some Manhattan CBD through-traffic ***[traveling between]*** Brooklyn, Queens, Long Island, ***[and]*** points in New Jersey and beyond to circumferential routes using the George Washington Bridge via the Cross Bronx Expressway and the Verrazzano-Narrows Bridge via the Staten Island Expressway. The higher overall CBD tolls under Tolling Scenarios D, E, and F would result in higher circumferential diversions compared to Tolling Scenarios A, B, C, and G, with lower CBD tolls.

4B.2.1 Summary of Highway Analysis to Determine Representative Tolling Scenario with Largest Increases in Traffic

Preliminary analyses were performed for all tolling scenarios to identify which tolling scenario(s) would have the greatest potential for traffic effects at local intersections and along highway segments, and these tolling scenarios were analyzed in detail. **Table 4B-1** presents the change in peak-hour traffic volumes, referred to as the increment, for all tolling scenarios analyzed using the BPM. These increments were used to determine the representative tolling scenario for analysis, the facilities/highways to analyze in detail, and the direction of the highway that needed to be analyzed, inbound or outbound. [4]

The Lincoln Tunnel and Holland Tunnel would have negative increments in both directions, with reduced traffic volumes under all tolling scenarios during the peak hours in the inbound direction. Since these two facilities would generally operate with less or the same delay, they were not analyzed further.

4 Highways are analyzed by direction using peak hour one-way traffic volumes while VMT, air quality, and noise analyses utilize two-way traffic volumes as inputs. Therefore, the applicable tolling scenario(s) with the highest potential for adverse effects may be different for traffic analyses than the scenario(s) used to analyze VMT, air quality, and noise effects.

Table 4B-1. Peak-Hour Incremental Traffic Volumes: Comparison of Tolling Scenarios*

FACILITY/HIGHWAY	DIRECTION	TIME PERIOD	PEA -HOUR TRAFFIC VOLUME INCREMENT (VEHICLES)						
			SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
Lincoln Tunnel/ NJ Route 495	Inbound	AM	-407	-433	-209	-86	-205	-162	-533
		MD	-434	-478	-283	-147	-269	-109	-508
		PM	-248	-243	-141	-73	-135	-140	-287
	Outbound	AM	-137	-149	-177	-173	-178	-184	-177
		MD	-561	-584	-631	-695	-741	-639	-651
		PM	-629	-672	-647	-784	-888	-805	-770
Holland Tunnel/I-78/ NJ Route 139	Inbound	AM	-206	-231	-127	-78	-164	-143	-309
		MD	-213	-231	-147	-105	-189	-70	-285
		PM	-300	-310	-215	-140	-242	-246	-386
	Outbound	AM	-210	-229	-267	-293	-307	-317	-260
		MD	-311	-354	-422	-463	-519	-465	-403
		PM	-96	-103	-71	-18	-81	-15	-109
Queens-Midtown Tunnel–Long Island Expressway (I-495)	Inbound	AM	-188	-186	253	126	127	125	-192
		MD	-114	-113	224	383	385	379	-120
		PM	-420	-358	241	203	202	202	-409
	Outbound	AM	-61	-65	-67	-25	-30	-24	-63
		MD	-229	-240	-251	163	165	162	-211
		PM	-273	-268	-316	350	335	343	-278
Hugh L. Carey Tunnel–Gowanus Expressway	Inbound	AM	52	80	145	71	71	70	30
		MD	-54	-60	217	482	482	482	-57
		PM	1	7	28	47	44	44	-7
	Outbound	AM	106	100	101	110	107	101	87
		MD	56	64	59	574	574	574	66
		PM	-58	-69	-61	543	543	547	-99

FACILITY/HIGHWAY	DIRECTION	TIME PERIOD	PEA -HOUR TRAFFIC VOLUME INCREMENT (VEHICLES)						
			SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
George Washington Bridge[1]	Inbound	AM	43	42	-72	-125	-144	-67	96
		MD	341	472	247	140	233	59	520
		PM	129	184	4	-89	-5	11	198
	Outbound	AM	-14	-8	-3	88	78	117	24
		MD	512	642	707	826	743	754	725
		PM	180	399	409	413	385	415	255
Verrazzano-Narrows Bridge/Staten Island Expressway	Inbound	AM	130	75	17	8	7	14	152
		MD	163	221	100	-8	37	-29	229
		PM	165	161	140	112	135	166	155
	Outbound	AM	77	89	160	230	213	209	124
		MD	211	207	290	400	372	345	248
		PM	170	174	238	240	243	235	210
FDR Drive–Between Williamsburg Bridge and Brooklyn Bridge	Southbound	AM	307	298	356	294	311	314	302
		MD	282	293	281	445	457	458	287
		PM	404	406	440	566	598	666	405
		LN	324	338	348	342	344	370	331
	Northbound	AM	253	298	249	275	285	313	276
		MD	156	231	105	97	107	61	193
		PM	307	298	356	294	311	314	302
		LN	282	293	281	445	457	458	287
Bayonne Bridge	Inbound	AM	421	154	137	275	376	415	145
		MD	273	160	144	266	317	346	142
		PM	239	78	57	161	213	248	87
		LN	47	7	9	37	54	66	9
	Outbound	AM	81	35	41	93	81	68	30
		MD	63	109	86	103	97	103	94
		PM	184	126	131	136	148	192	131
		LN	-1	19	15	12	1	6	25

FACILITY/HIGHWAY	DIRECTION	TIME PERIOD	PEA -HOUR TRAFFIC VOLUME INCREMENT (VEHICLES)						
			SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
Robert F. ennedy Bridge	Inbound	AM	586	457	481	506	508	487	527
		MD	261	250	233	273	261	250	279
		PM	600	558	510	521	634	581	576
		LN	110	89	86	78	93	117	77
	Outbound	AM	418	374	387	396	396	404	485
		MD	505	569	503	545	474	512	559
		PM	630	597	605	606	612	617	637
		LN	576	569	554	607	598	636	630
I-95 Eastern Spur	Inbound	AM	143	-33	-12	26	98	89	-31
		MD	202	183	130	203	218	193	217
		PM	61	21	6	39	56	65	23
		LN	109	3	3	65	104	138	8
	Outbound	AM	58	53	35	38	53	58	51
		MD	62	76	90	80	63	121	118
		PM	144	100	58	102	80	93	95
		LN	-22	0	-5	-12	-16	-13	0

Source: BPM Facility Volumes (CBD Tolling Alternative minus No Action Alternative).
* Analyzed demand volumes.
1 **Table 4B-21** shows a detailed breakdown of the projected traffic volume increases along the Trans-Manhattan Expressway and Cross Bronx Expressway, which would be lower.

Two facilities crossing the Manhattan CBD—the Queens-Midtown Tunnel and Hugh L. Carey Tunnel—would be expected to have higher increases in traffic volumes inbound under Tolling Scenarios C, D, E, and F compared to other tolling scenarios, some of which have a negative increment. The volume increments for these tolling scenarios generally fall within a very narrow range and are expected to have similar effects. Only the inbound direction was analyzed because that direction experiences higher levels of congestion and delays.

Two facilities that handle circumferential diversion of through Manhattan CBD trips—the Verrazzano-Narrows Bridge and the George Washington Bridge—are expected to have higher increases in outbound (westbound) traffic volumes under Tolling Scenarios C, D, E, and F compared to other tolling scenarios. The George Washington Bridge/Trans-Manhattan/Cross Bronx Expressway corridor was assessed analytically and qualitatively because the data to properly build and calibrate a Vissim microsimulation model were not available (and current data would not be representative given the COVID-19 pandemic). Only the outbound (westbound) direction was analyzed for both the George Washington Bridge (New Jersey-bound) and the Verrazzano-Narrows Bridge (Staten Island bound) because the volume increments and congestion would be higher in that direction.

For all highway analyses, Tolling Scenario D was chosen as the representative tolling scenario due to having daily volumes that land between Tolling Scenarios E and F. In addition, Tolling Scenario D generally presented larger peak-hour volumes. For these reasons, Tolling Scenario D was analyzed in detail. For congested roadway segments, a Vissim microsimulation model was used to analyze the No Action Alternative and the CBD Tolling Alternative for the representative tolling scenario where a model was available. For roadways operating at higher speeds of 40 mph or greater, the Highway Capacity Software (HCS) model was used. A qualitative and analytical method was used to analyze congested roadways where neither a Vissim model nor reliable pre-COVID-19-pandemic traffic data were available since the HCS is not applicable for evaluation of congested roadways. A qualitative approach was also used in instances where all tolling scenarios would result in lower traffic volumes at a facility and its approaches.

4B.2.2 Summary of Intersection Analysis to Determine Representative Tolling Scenario with Highest Potential Increase in Traffic

The number of intersections projected to have an increase of 50 or more vehicles in a peak hour was used as a basis for evaluating the relative potential of each tolling scenario to trigger adverse effects and to determine which tolling scenario(s) to analyze in detail. The tolling scenarios with the highest crossing credits produced the highest number of intersections that would experience an increase of 50 or more vehicles in a peak hour. Because the number of intersections that would be potentially adversely affected correlates directly with the increase in facility crossing volumes feeding those intersections, this methodology was also used to identify which tolling scenario(s) to analyze in detail to evaluate potential adverse effects along highways leading to these crossing facilities. Diversion to circumferential routes that avoid the Manhattan CBD was found to be directly related to the level of CBD tolls (due to CBD toll crossing credits); therefore, the methodology also works to identify which tolling scenario(s) to analyze in detail for circumferential routes. The results of the BPM modeling confirmed that tolling scenarios with the highest tolls (and tolling crossing credits) produced the highest diversions to the Hugh L. Carey Tunnel and Queens-Midtown Tunnel, as well as along circumferential routes.

Table 4B-2 summarizes the number of times the peak-hour volume increment meets or exceeds the threshold of 50 or more vehicles for any given intersection (or intersection approach) within the traffic study areas established for this EA. Peak-hour traffic increments generated by each tolling scenario were assigned to evaluate the potential increase (or decrease) in traffic per the methodology described in **Appendix 4B.1, "Transportation: Transportation and Traffic Methodology for NEPA Evaluation."** This evaluation was the basis for determining the representative tolling scenario to use for detailed traffic impact analysis.[5]

As shown in **Table 4B-2**, Tolling Scenarios A, B, and G—with the lowest tolls along with the fewest discounts or exemptions, and no crossing credits—would result in an overall reduction in traffic and minimal shift of traffic to alternate routes. Increases in traffic volumes along alternate routes would result in 9, 10, and 10 instances out of 363,[6] respectively, where intersection or approach volumes would increase by 50 or more vehicles in a peak hour. Tolling Scenario C—with higher tolls along with discounts, exemptions, and partial crossing credits—would result in routing changes that lead to 24 instances where peak-hour volumes would increase by 50 or more vehicles at intersections or approaches. Tolling Scenarios D, E, and F incorporate higher tolls and more widely applied crossing credits, discounts, and/or exemptions, leading to 50, 48 and 50 instances out of 363 of an increase of 50 or more peak-hour vehicles at any intersection or intersection approach, respectively.

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5 The 50 or more additional vehicles threshold was used only to determine the representative tolling scenario for detailed traffic analysis; all intersections in the 15 study areas were analyzed regardless of whether traffic volumes increased or decreased.

6 A total of 363 intersection analyses were performed at 102 locations during the AM, MD, PM, and LN peak hours.

Table 4B-2. Instances of Intersections Meeting/Exceeding the Traffic Volume Screening Threshold in an Analysis Hour: Comparison of Tolling Scenarios

STUDY AREA	SCENARIO A	SCENARIO B	SCENARIO C	SCENARIO D	SCENARIO E	SCENARIO F	SCENARIO G
Downtown Brooklyn	2	2	2	0	0	0	2
Hugh L. Carey Tunnel and Holland Tunnel–Lower Manhattan	0	0	8	18	17	17	0
Hugh L. Carey Tunnel–Red Hook	0	0	0	7	7	7	0
Holland Tunnel–Jersey City	0	0	0	2	0	2	0
Lincoln Tunnel–Manhattan	0	0	0	0	0	0	0
East Side at 60th Street–Manhattan	1	1	1	2	2	2	1
West Side at 60th Street–Manhattan	0	0	0	0	0	0	0
Queens-Midtown Tunnel–Manhattan	0	0	2	5	5	5	0
Queens-Midtown Tunnel/Ed Koch Queensboro Bridge–Long Island City	1	1	4	9	9	10	1
Robert F. Kennedy Bridge–Queens	2	2	3	3	3	2	2
Robert F. Kennedy Bridge–Bronx	0	0	0	0	0	0	0
Robert F. Kennedy Bridge–Manhattan	3	4	3	3	4	4	3
West Side Highway/Route 9A at West 24th Street–Manhattan	0	0	0	0	0	0	0
Lower East Side–Manhattan	0	0	0	0	0	0	0
Little Dominican Republic–Manhattan	0	0	1	1	1	1	1
TOTAL	9	10	24	50	48	50	10

Source: WSP, 2022.

Tolling Scenarios D, E, and F provide the most extensive crossing credits for tolls paid at existing tolled facilities and would result in the greatest shift of traffic to the Queens-Midtown Tunnel and the Hugh L. Carey Tunnel. These tolling scenarios also have the highest tolls, due to the need to offset the revenue loss due to crossing credits, resulting in the highest diversion to circumferential routes via the Verrazzano-Narrows Bridge and the George Washington Bridge. Although Tolling Scenarios D and F have the same number of exceedances of the threshold with 50 instances, Tolling Scenario D was selected for detailed traffic analysis because it has a higher number of potentially affected intersections in the critical Lower Manhattan Study Area. However, it should be noted that Tolling Scenarios D, E, and F are very similar and would be expected to have very similar potential traffic effects; therefore, Tolling Scenario D is considered to be the representative tolling scenario inclusive of Tolling Scenarios E and F.

The Synchro traffic model was used to perform a detailed analysis of intersections for Tolling Scenario D. An additional Synchro analysis was performed in the Downtown Brooklyn study area for Tolling Scenario C, which was determined to have a higher potential for traffic effects in two instances where the increase in traffic volumes is projected to be 50 or more vehicles.

Calibrated Vissim microsimulation traffic models adapted for the CBD Tolling Alternative were used to perform detailed traffic analyses of the highway approaches to the Hugh L. Carey Tunnel and Queens-Midtown Tunnel, which are projected to have the highest increase in traffic volumes under Tolling Scenario D. A Vissim analysis was also performed at the Verrazzano-Narrows Bridge and its approaches to evaluate the potential traffic effects due to circumferential route diversion. An analytical and qualitative traffic analysis was performed at the George Washington Bridge including its approaches, and the Franklin D. Roosevelt (FDR) Drive near the Manhattan Bridge because pre-COVID-19-pandemic data were not available to create a Vissim traffic model at these locations. An estimation of the potential traffic effects was made based on the projected increase in traffic volumes in relation to the projected increase in traffic volumes at the Queens-Midtown Tunnel and the Long Island Expressway where detailed modeling was performed. Additional analyses were completed using HCS for the Bayonne Bridge, the Eastern Spur of I-95 New Jersey Turnpike, and a section of the Robert F. Kennedy (RFK) Bridge from Queens to the ramp connecting with the Manhattan leg of the RFK Bridge.

4B.3 OVERVIEW AND CONTEXT

An extensive network of highways serves the 28-county regional study area (see **Figure 3-1** in **Chapter 3, "Environmental Analysis Framework"**). This section describes the existing highway network at two levels:

- A broad discussion of highways throughout the regional study area
- A more detailed presentation of the highways that directly connect to the Manhattan CBD or are used to bypass the Manhattan CBD

Many of the region's highways connect directly with the bridges, tunnels, and local roadways that access the Manhattan CBD. Other major highways are circumferential in nature and provide regional access, bypassing the Manhattan CBD. The highway network includes several primary interstates (e.g., I-78, I-80, I-84, I-87, and I-95), auxiliary interstate routes (e.g., I-278, I-287, I-495, and I-684), and other limited-access state highways (e.g., NJ Route 3, NJ Route 4, NJ Route 17) and parkways (e.g., Grand Central Parkway, Henry Hudson Parkway). See **Appendix 4B.8, "Transportation: Overview of Highways Throughout the Study Area."**

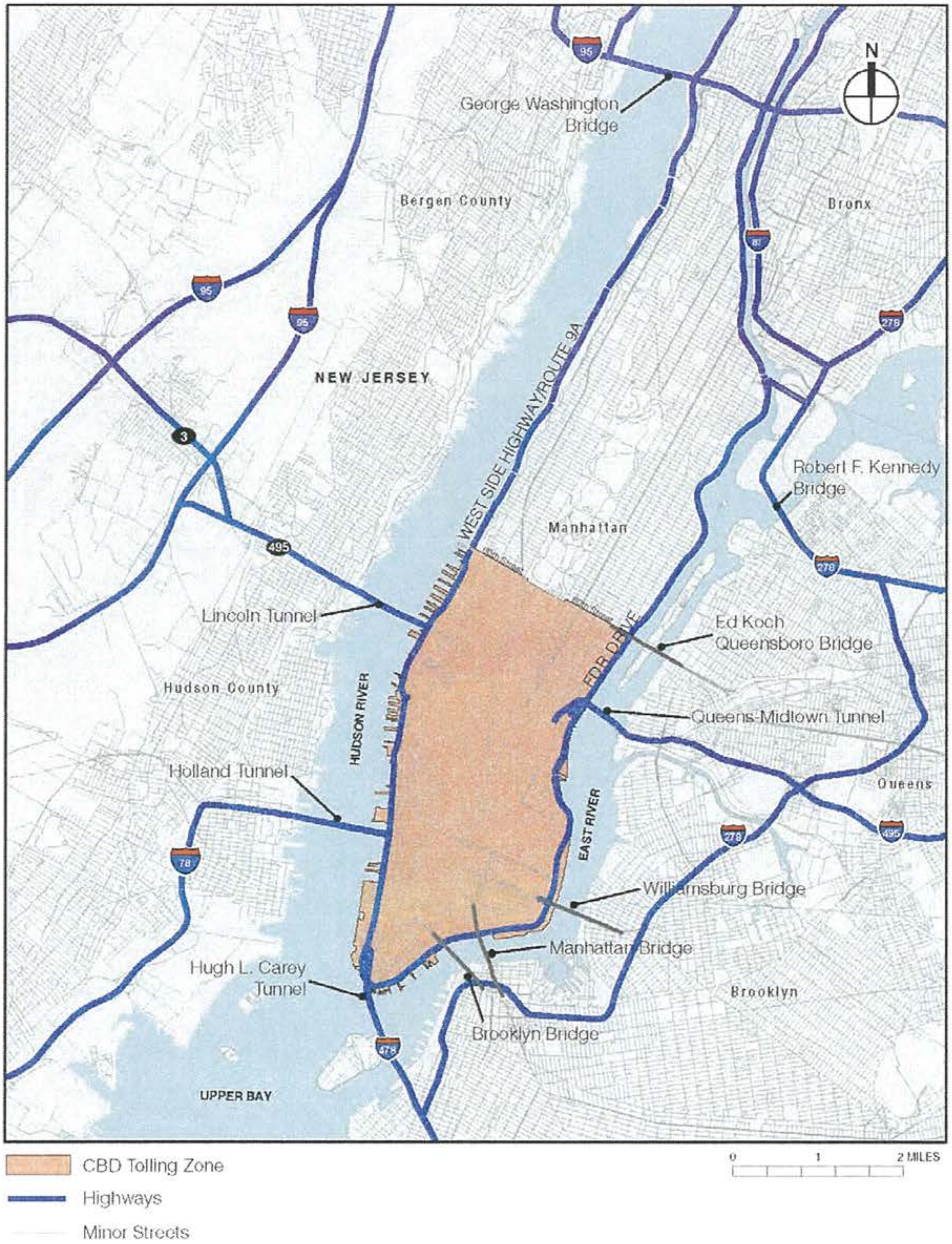
The potential effects on area highways from the Project under the representative tolling scenario would be concentrated on certain highways that directly lead into the Manhattan CBD and those that provide circumferential service around the Manhattan CBD. Direct highway routes to the Manhattan CBD that are unlikely to experience increases in traffic volumes from diversions would be expected to have reductions in traffic across all tolling scenarios and, therefore, a beneficial effect on traffic operations. Locations farther from the Manhattan CBD (or without direct routes to and from the Manhattan CBD) would be less affected as Manhattan CBD traffic becomes more dispersed throughout the region.

4B.3.1 Overview of Roadways and Highways Leading to the Manhattan CBD

This section gives an overview of the key roadways and highways that lead directly to the Manhattan CBD, for the purpose of providing appropriate background and context for the highway and intersection impact analyses later in this subchapter. The roadway descriptions are grouped by crossing location: Uptown Manhattan, Queens, Brooklyn, and New Jersey.

Figure 4B-2 shows the key highways in the area directly leading to the Manhattan CBD.

Figure 4B-2. Highways Leading to the Manhattan CBD



Source: ESRI, NYC Open Data, NYMTC 2020 TransCAD Highway Network.

UPTOWN MANHATTAN APPROACHES (60TH STREET CROSSINGS)

The northern boundary of the CBD tolling area inclusive of 60th Street is accessed by two highways and 16 avenues. From west to east, these highways and avenues are listed below, along with the number of lanes at the 60th Street Manhattan CBD boundary:

- **Route 9A** runs along the east side of the Hudson River from Lower Manhattan continuing northward through Upper Manhattan, the Bronx and Westchester County. It is known as West Street from the southern tip of Manhattan to West 14th Street, Eleventh Avenue from West 14th Street until West 22nd Street, Twelfth Avenue from West 22nd Street until West 58th Street, the Joe DiMaggio Highway from West 58th Street to West 72nd Street, and the Henry Hudson Parkway from West 72nd Street through the Bronx. In the Bronx, Route 9A serves as a local arterial up to the northern end of Westchester County. It is a bi-directional highway with six to eight lanes, with an elevated northern section (from West 59th Street to West 72nd Street) and an at-grade southern section south of West 59th Street. Trucks and buses are permissible only on the surface section, south of West 59th Street.
- **Twelfth Avenue** is a one-way, northbound street. It begins at an intersection with West Side Highway/Route 9A at West 54th Streets and continues to West 61st Street with one traffic lane and one parking lane. At West 61st Street, it continues as Riverside Boulevard, which is a two-way street with one traffic and one parking lane in both directions.
- **Eleventh Avenue/West End Avenue** starts at the West Side Highway/Route 9A between West 21st Street and West 22nd Street and continues north along the west side of Manhattan. South of West 34th Street, it is one-way southbound. Between West 34th and West 40th Street it is a two-way street. Between West 40th and West 57th Street, it is one-way southbound. North of West 57th Street, it is a two-way street. The number of traffic lanes varies; at the 60th Street Manhattan CBD boundary, it has two traffic lanes and a parking lane in both directions, plus a striped median/turn lane.
- **Tenth Avenue/Amsterdam Avenue** begins at West 14th Street and carries northbound traffic as far as West 110th Street (Cathedral Parkway), where it then continues as a two-way street. At the 60th Street Manhattan CBD boundary, it has three traffic lanes, a dedicated bicycle lane, and two parking (also used for loading and bus stop locations) lanes.
- **Ninth Avenue/Columbus Avenue** is a southbound street. It ends south of West 14th Street at Gansevoort Street in the West Village and extends uptown to West 59th Street, where it becomes Columbus Avenue. Columbus Avenue extends through the Upper West Side to West 110th Street, where it changes name to Morningside Drive, and runs north through Morningside Heights to West 122nd Street. At the 60th Street Manhattan CBD boundary, it has three traffic lanes, two parking lanes, and a protected bicycle lane.
- **Broadway** originates in Lower Manhattan and runs diagonally across the Manhattan street grid through the length of Manhattan, through the Bronx and into Westchester County to counties north of New York City. The street width and street direction vary widely, and in certain segments such as in Times Square, the street has been pedestrianized. At the 60th Street Manhattan CBD boundary, it has three traffic lanes and one parking lane in each direction, separated by a landscaped median.

- **Eighth Avenue** is a one-way northbound street that starts in the West Village at the intersection of Hudson Street and Bleecker Street and runs north to Columbus Circle at West 59th Street and then changes name to become Central Park West. North of West 110th Street the name changes to Frederick Douglass Boulevard. This avenue ends north of West 155th Street and merges into Harlem River Drive. At the 60th Street Manhattan CBD boundary, it has two traffic lanes, one parking lane, one loading/no standing lane, and a protected bicycle lane.
- **Seventh Avenue** is a one-way southbound street that originates at West 59th Street/Central Park South and runs south to the intersection of Carmine Street/Clarkson Street and Seventh Avenue, before turning into Varick Street. The northern boundary of the avenue connects to the Central Park roadway system, which is open to authorized vehicles part time.
- **Sixth Avenue** is a one-way northbound street that starts in Tribeca at the intersection of Church Street and Franklin Street and runs north to West 59th Street/Central Park South. The northern edge of the avenue connects to the Central Park roadway system, which is open to authorized vehicles part time.
- **Fifth Avenue** is a southbound avenue that originates at the Harlem River Drive near 143rd Street and passes through Manhattan along the east side of Central Park and through Midtown to Washington Square Park in Greenwich Village. At its northern end, the avenue is fed by both the Harlem River Drive and Madison Avenue Bridge (from the Bronx) and is bisected by Marcus Garvey Park near 120th Street. At the 60th Street Manhattan CBD boundary, it has two traffic lanes, one bus lane, one parking lane, and a turn lane.
- **Madison Avenue** is a north–south avenue beginning at Madison Square Park (at East 23rd Street) to the Madison Avenue Bridge over the Harlem River at West 142nd Street. Madison Avenue carries one-way northbound traffic from East 23rd Street to East 135th Street. Between East 135th Street and East 142nd Street, Madison Avenue only carries traffic to/from the Madison Avenue Bridge, though there is also a service road on this segment named Madison Avenue that is not connected to the rest of the avenue in Manhattan and carries southbound traffic only from the Harlem River Drive. At the 60th Street Manhattan CBD boundary, it has two traffic lanes, a double bus lane, and a turn lane.
- **Park Avenue** extends from Astor Place in Cooper Square to East 138th Street and carries both northbound and southbound traffic south of East 132nd Street. The avenue is called Union Square East between East 14th and East 17th Streets, and Park Avenue South between East 17th and East 32nd Streets. Between East 33rd Street and East 40th Street, there is a one-lane northbound vehicular tunnel. Park Avenue splits by direction to wrap around Grand Central Terminal and other adjacent buildings at East 42nd Street. It rejoins at East 45th Street. North of East 97th Street, the landscaped median is replaced by Metro-North Railroad's four tracks as it transitions from tunnel to an elevated structure. At the 60th Street Manhattan CBD boundary, Park Avenue has three traffic lanes and a parking lane in each direction, separated by a wide landscaped median.
- **Lexington Avenue** carries southbound, one-way traffic from East 131st Street to Gramercy Park at East 21st Street. At the 60th Street Manhattan CBD boundary, it has three traffic lanes, one weekday-only curb bus lane (parking lane on weekends), and one parking lane.

- **Third Avenue** begins at the intersection of Cooper Square and East 6th Street and continues north to 128th Street. It carries two-way traffic between East 6th Street and East 24th Street, whereupon it is one-way, northbound until it terminates at 128th Street in Manhattan. At the 60th Street Manhattan CBD boundary, it has four traffic lanes, one parking lane, and a turn lane.
- **Second Avenue** carries southbound traffic from Harlem River Drive at East 128th Street to Houston Street. South of Houston Street, the roadway continues as Chrystie Street south to Canal Street. At the 60th Street Manhattan CBD boundary, it has five traffic lanes, one bus lane, and a bicycle lane. Second Avenue provides a connection to the Ed Koch Queensboro Bridge and the Queens-Midtown Tunnel.
- **First Avenue** begins at Houston Street and travels northbound for over 125 blocks before terminating at the Willis Avenue Bridge into the Bronx at the Harlem River near East 126th Street. South of Houston Street, the roadway continues as Allen Street south to Division Street. First Avenue is a one-way, northbound street. At the 60th Street Manhattan CBD boundary, it has four traffic lanes, one bus lane and a protected bicycle lane.
- **Sutton Place/York Avenue** is a two-way street between East 53rd and East 92nd Streets. At the 60th Street Manhattan CBD boundary, York Avenue has two traffic lanes and one curb lane in each direction. Both curb lanes are used as a bus stop/additional travel lane.
- **FDR Drive** follows the East River shoreline between the Battery Park Underpass and approximately East 125th Street where it continues to Dyckman Street as the Harlem River Drive. It is a limited-access highway with interchanges at principal east–west streets. It also provides direct connections to the Brooklyn, RFK and George Washington Bridges. Commercial vehicles are prohibited on the FDR Drive, and there are height restrictions along its route.

Connections to the north end of Manhattan are provided by the George Washington Bridge (I-95), the Alexander Hamilton Bridge (I-95), the Henry Hudson Parkway and Henry Hudson Bridge, the RFK Bridge, and eight local roadway bridges that cross the Harlem River from the Bronx.

QUEENS CROSSINGS

The **Ed Koch Queensboro Bridge** connects the Upper East Side of Manhattan to Long Island City, Queens. It is a two-level bridge over the East River, passing over Roosevelt Island. In Queens, it is fed by Queens Boulevard, Northern Boulevard, 21st Street, and other local streets. The upper level of the bridge has four lanes, with two vehicular lanes in each direction. The lower level has five vehicular lanes and one shared-use bicycle and pedestrian path. During the AM time period, the upper-level southern roadway operates as a high-occupancy vehicle (HOV) contra-flow into Manhattan. The inner four and the southernmost lanes are used for automobile traffic. The northernmost lane was converted into a pedestrian walk and bicycle path in 2000.[7] In Manhattan, there are exits from the upper level of the bridge to East 62nd Street and East 63rd Street and from the lower level of the bridge to Second Avenue and East

[7] NYCDOT plans to convert the southern outer roadway on the lower level to a dedicated pedestrian path and to move pedestrians from the existing dedicated shared bicycle/pedestrian lane on the northern outer roadway to the southern outer roadway. It was assumed that this plan will be implemented by 2023 and was therefore included in the No Action Alternative roadway network.

60th Street. There are entrances from Second Avenue, East 57th, East 58th, and East 59th Streets. There is no toll to cross this bridge.

The **Queens-Midtown Tunnel** is a vehicular tunnel under the East River from the east side of Manhattan, in the residential neighborhood of Murray Hill, to the Hunters Point District of Long Island City. In Queens, the tunnel merges directly into the Long Island Expressway (I-495), which is approximately 1.5 miles west of the Long Island Expressway interchange with the Brooklyn-Queens Expressway (BQE). There are two tubes—one eastbound and one westbound—with two travel lanes each, although one lane of the eastbound tube is operated contra-flow during the AM peak period. In Manhattan, the tunnel is accessed via East 34th Street, East 36th Street, and Second Avenue. Vehicles exiting the tunnel can access East 37th Street or East 41st and East 34th Streets via Tunnel Exit Street. The TBTA collects tolls in both directions.

BROOKLYN CROSSINGS

The **Williamsburg Bridge** connects the Lower East Side of Manhattan at Delancey Street with the Williamsburg neighborhood of Brooklyn. In Brooklyn, it is fed by the BQE (I-278) and various local streets. In Manhattan, it is primarily fed by Delancey Street. The Williamsburg Bridge has eight lanes of vehicular traffic, two subway tracks, a pedestrian walkway, and a bikeway. There is no toll to cross this bridge.

The **Manhattan Bridge** connects Lower Manhattan at Canal Street to Downtown Brooklyn at Flatbush Avenue. In Manhattan, it is primarily fed by Canal Street. In Brooklyn, it is fed by the BQE (I-278), Flatbush Avenue, and various local streets. The Manhattan Bridge has seven lanes of vehicular traffic, four subway tracks, a pedestrian walkway, and a bikeway. There is no toll to cross this bridge.

The **Brooklyn Bridge** connects Lower Manhattan near City Hall to Downtown Brooklyn. In Manhattan, it is fed by the FDR Drive, Center Street/Park Row, and other local streets. In Brooklyn, it is fed by the BQE (I-278), Cadman Plaza, and various local streets. The bridge has two inbound travel lanes, three outbound travel lanes, and a pedestrian path. A travel lane in the Manhattan-bound direction was recently converted into a two-way bicycle lane, which is included in the No Action Alternative roadway network. There is no toll to cross this bridge, and commercial vehicles are prohibited.

The **Hugh L. Carey Tunnel** (I-478) connects the southern tip of Manhattan with Red Hook in Brooklyn. There are two tubes—one northbound and one southbound—with two travel lanes each. During the AM and PM, one of the lanes operates in a contra-flow direction to provide more peak direction lane capacity. In Manhattan, the tunnel is fed by West Side Highway/Route 9A and local streets. In Brooklyn, it is fed by the BQE (I-278), the Gowanus Expressway, Prospect Expressway, and local streets. The TBTA collects tolls in both directions.

NEW JERSEY CROSSINGS

Three vehicular Hudson River crossings provide connections between New Jersey and Manhattan of which only the two tunnels connect directly to the Manhattan CBD. The Port Authority of New York and New Jersey collects tolls on the following crossings in the eastbound direction.

- The **Holland Tunnel** is a vehicular tunnel under the Hudson River, connecting Lower Manhattan and Jersey City. In New Jersey, it is fed by the New Jersey Turnpike Extension (I-78), the Pulaski Skyway (US 1/9), and local roadways. The tunnel consists of two tubes, with two traffic lanes in each tube. The northern tube, which carries westbound traffic, originates at Broome Street in Manhattan between Varick and Hudson Streets and continues to 14th Street east of Marin Boulevard in Jersey City. The southern tube, carrying eastbound traffic, originates at 12th Street, east of Marin Boulevard, in Jersey City, New Jersey, and surfaces at the Holland Tunnel rotary in Manhattan just south of Canal Street.
- The **Lincoln Tunnel** is a vehicular tunnel under the Hudson River, connecting Midtown Manhattan and Weehawken, New Jersey. The tunnel consists of three vehicular tubes, with two traffic lanes in each tube. The center tube contains reversible lanes and is heavily used by buses, particularly during the morning peak when it serves as a de facto final leg of the Exclusive Bus Line (XBL) along NJ Route 495 leading to the Lincoln Tunnel. The northern and southern tubes exclusively carry westbound and eastbound traffic, respectively. In New Jersey, the Lincoln Tunnel is fed by NJ Route 495, which connects to the New Jersey Turnpike and NJ Route 3. In Manhattan, it is fed by Ninth and Eleventh Avenues, and a combination of local streets with dedicated ramps to the Port Authority Bus Terminal.

4B.4 HIGHWAY ASSESSMENT

4B.4.1 Methodology

TRAFFIC ASSIGNMENT

The BPM was used to determine projected changes in traffic volumes at bridges, tunnels, and/or highways crossing into or out of the Manhattan CBD, along major north–south roadways in Manhattan, and along bypass routes including the Verrazzano-Narrows Bridge, George Washington Bridge, and RFK Bridge and their approaches. This increase or decrease in volume is referred to as the BPM increment. The initial 2017 BPM forecast volumes were compared to observed traffic volumes for 2017 and then calibrated at each facility within each sector to account for over- or under-assignment of trips by the BPM as detailed in the methodology for trip assignments in **Appendix 4B.1, "Transportation: Transportation and Traffic Methodology for NEPA Evaluation."**[8]

To evaluate the potential effects of the Project on the highway system, 10 highway corridors potentially affected were identified using the BPM and assessed as described below:[9]

- Long Island Expressway (I-495) leading to the Queens-Midtown Tunnel

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8 Additional adjustments were made to account for a bounce back factor to adjust modeled demand in consideration of available capacity at any given facility when drivers would likely quickly return to their original route choice due to higher congestion and delays along the diversion route. The bounce back traffic volumes were subtracted from the initial CBD Tolling Alternative facility traffic volumes and added back to the original facility traffic volumes. Please see **Appendix 4B.1, "Transportation: Transportation and Traffic Methodology for NEPA Evaluation"** for additional information on this methodology.

9 These corridors were initially identified using the BPM, which showed traffic volume increases along these corridors for some tolling scenarios. Subsequent post-processing was used to determine the volume increment after adjusting for calibration variance and capacity constraints. Subsequent BPM screening runs were made for all tolling scenarios to identify additional highway segments that are projected to have volume increases greater than 5 percent.

- Gowanus Expressway leading to I-278 Hugh L. Carey Tunnel
- Staten Island Expressway leading to the Verrazzano-Narrows Bridge
- I-78 approach to the Holland Tunnel[10]
- NJ Route 495 approach to the Lincoln Tunnel
- Trans-Manhattan/Cross Bronx Expressway between the George Washington Bridge and I-87[11]
- FDR Drive—East 10th Street to Brooklyn Bridge
- The Bayonne Bridge and Approaches
- Eastern Spur of I-95 New Jersey Turnpike
- RFK between Queens and Ramps to/from Manhattan

Refer to **Appendix 4B.1, "Transportation: Transportation and Traffic Methodology for NEPA Evaluation,"** for more information about the analysis methodology. It should be noted that throughout the public consultation period, concerns were expressed regarding potential traffic impacts on several of these highway corridors, given their proximity to environmental justice communities.

Two of the 10 corridors, the NJ Route 495 approach to the Lincoln Tunnel, and the I-78 approach to the Holland Tunnel were assessed analytically for the Existing conditions and qualitatively for the No Action Alternative and the CBD Tolling Alternative since there would be a net reduction in traffic under the analyzed tolling scenarios (Tolling Scenarios D, E, and F) and a higher net reduction in traffic for all other tolling scenarios. Therefore, these two corridors would be expected to have fewer delays and improved traffic operations under all tolling scenarios.

The remaining eight highway corridors analyzed would be expected to have higher traffic volumes at certain locations for some tolling scenarios. A variety of analytic tools and methods were used to evaluate the effects of the CBD Tolling Alternative, depending on the level of congestion and the appropriateness of the use of available models. *[12]*

With highway peak-hour traffic assignments, and particularly in the absence of detailed Vissim microsimulation modeling, SEQRA and National Environmental Policy Act evaluations have used an initial assessment of incremental volumes as a more qualitative measure of potential effect. This is essentially an estimate of whether the variation in total volume falls within a reasonable band of typical volume variations that could be expected with or without a proposed project and where there would not be a noticeable change in speeds, travel times, or delays. For assessment purposes, it is assumed to be a change of 5 percent or less under congested conditions at LOS E or LOS F[13] based upon the analyzed effects of such

10 There was a small net decrease in traffic volumes at the Holland Tunnel approaches since the traffic reduction due to CBD tolling was greater than diverted traffic to the facility.

11 An analytical and qualitative analysis was performed at the George Washington Bridge and its approaches and along the FDR Drive south of East 10th Street because a Vissim model was not available for this location.

[12 The highway assessment considered the effects of the CBD Tolling Alternative using the tolling scenario with the highest potential diverted traffic volumes, Tolling Scenario D. For the Final EA, the Project Sponsors committed to additional mitigation measures (see Chapter 16, "Summary of Effects," Table 16-2). These new mitigation commitments neither require a change in the tolling scenarios used for the analyses in the EA nor change the fundamental conclusions of the EA (see Chapter 3, "Environmental Assessment Framework," Section 3.3.3).]

13 Under SEQRA, a higher increase in volume is not considered to have an adverse effect if the LOS for the build condition is D or better.

volume increases where microsimulation was performed. If that is determined to be the case, then it can be expected that there would be no adverse effect.

For three highway locations, there was a Vissim model available which was adapted and used to analyze the potential traffic effects of the CBD Tolling Alternative. Each model was recalibrated to the existing condition volumes, geometry, and travel times. This type of model is particularly useful under congested conditions but can also be used at non-congested locations.

For three highway locations without an available Vissim model (the Bayonne Bridge and approaches, the eastern spur of I-95 New Jersey Turnpike, and the RFK Bridge between Queens and ramps to/from Manhattan), the HCS was used to evaluate the incremental traffic volume and obtain performance measures including change in delay and LOS. HCS models cannot be used effectively under congested conditions where the volume/capacity ratio is greater than 1. None of the models exceed the volume/capacity ratio threshold under any condition.

For two congested highway segments without an available Vissim model (the Trans-Manhattan Expressway/Cross Bronx Expressway and the FDR Drive south of East 10th Street), and where the HCS methodology is not appropriate, evaluation of the incremental traffic volume change provides the basis for the assessment of potential adverse effects.[14]

HIGHWAY ANALYSIS METHODOLOGY AND DETERMINATION OF POTENTIAL ADVERSE EFFECTS

To determine whether diversions of traffic to highway segments from new tolls are significant, FHWA typically consults with state sponsoring agencies—such as NYSDOT as well as, in this case, TBTA, an affiliate of MTA, a New York State public benefit corporation—with expertise in transportation analyses, to determine the appropriate criteria. After careful review of how other state agencies have applied SEQRA to determine the significance of diversionary effects on highways, along with detailed Vissim or HCS analyses used to evaluate roadway stress thresholds, TBTA and NYSDOT, in consultation with NYCDOT, have agreed that the following criteria are appropriate for determining the significance of traffic effects along highways potentially affected by the Project:

- Under very congested conditions, at speeds of 20 mph or less, an increase in traffic volumes of up to 5 percent would not be considered significant.
- At speeds over 20 mph, an increase in traffic volume of up to 10 percent would not be considered significant.

The above guidelines are intended as a screening threshold under congested conditions. Highway segments on the fringe of the threshold would be carefully evaluated. Cases where highway segments surpass the volume threshold but would have only a minimal degradation in traffic operations and speed would not be considered as having an adverse effect. Determination of adverse traffic effects needs to consider the overall trip length and the variability in travel time that affects user perceptions of travel time. In general,

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14 A similar approach was used for the *Tappan Zee Bridge Hudson River Bridge Crossing Project FEIS*, Vol. 1, Chapter 4, Page 4-18.

based on modeling results along congested and uncongested corridors, the 5 percent and 10 percent thresholds would produce decreases in speeds and increases in travel times that would be relatively small within the context of average travel times in the New York City area; therefore, the change in delays and travel times would not be noticeable to most motorists. More information on the highway screening process can be found in **Appendix 4B.1, "Transportation: Transportation and Traffic Methodology for NEPA Evaluation."**

SEQRA CRITERIA USED TO DETERMINE ADVERSE TRAFFIC EFFECTS FOR HIGHWAYS

Where a detailed traffic analysis was performed using the Vissim model or HCS an additional SEQRA criterion was applied to determine adverse highway effects that relies on an increase in delay of 2.5 minutes or greater. This criterion was derived from an examination of average weekday travel times to the Manhattan CBD from the outer Boroughs based on FHV recorded travel time and distance between passenger pickups and drop-offs prior to COVID-19 and during spring 2022 when average travel times rebounded to pre-pandemic levels.

Average travel times to the Manhattan CBD from the outer boroughs during the weekday between 6:00 a.m. and 8:00 p.m. vary from about 35 minutes from Brooklyn, 45 minutes from the Bronx, 45 minutes from Queens, and about 58 minutes from Staten Island. A 2.5 minute increase in travel time under the SEQRA threshold would represent about a 5 percent increase in total travel time, depending on the trip origin, with shorter trips experiencing a higher percent change and longer trips experiencing a smaller percent change in travel time. See **Appendix 4B.7, "Transportation: Average Travel Time by Borough."**

Because ***[an]*** increase in travel time ***[of less than 2.5 minutes]*** would not be noticeable to most drivers over the length of the average trip, ***[an increase of this magnitude]*** is an appropriate threshold for determining adverse traffic effects. This threshold was applied at all locations where a detailed traffic analysis was performed. Where a detailed traffic analysis was not performed due to the lack of availability of a calibrated Vissim model, or where reliable preCOVID19 traffic data were not available, the following SEQRA criteria were used to determine adverse effects: an increase in traffic volumes greater than 5 percent at speeds of less than 20 mph, or an increase in traffic volumes greater than 10 percent at speeds of 20 mph or higher.

It should be noted that the average travel time savings within the Manhattan CBD is estimated at about 4 minutes inbound and 4 minutes outbound which would offset any potential increases in travel times to the Manhattan CBD that would be experienced by some drivers under certain tolling scenarios.

MICROSIMULATION MODEL

Vissim microsimulation models were developed[15] along the key highway segments potentially affected under Tolling Scenario D, which is representative of the tolling scenarios (including Tolling Scenarios E and F), to simulate vehicular movements in a dynamic setting and to create a virtual environment to replicate

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15 Calibrated Vissim models were derived from previous studies, where available, and adapted and updated for the Project traffic study. Vissim models were not available for the Trans-Manhattan Expressway/Cross-Bronx Expressway corridor and the FDR Drive corridor. These two corridors were analyzed using a combination of analytical and qualitative methods. As noted in **Section 4B.1, "Transportation: Transportation and Traffic Methodology for NEPA Evaluation,"** current data would not be representative due to the pandemic and thus could not be used to develop a Vissim model for certain roadways.

traffic conditions. These models were calibrated based on 2019 existing conditions, including traffic volumes processed[16] by the model, average speed, and observed queue lengths. Processed volumes reflect the number of vehicles that were able to enter the simulation model and traverse the analyzed segment within the analysis time period. Vehicles that are not processed in the analysis time period are considered to be the unmet demand and are therefore in queue outside of the simulated area at the end of the analysis time period. Average speed is calculated over the length of the analyzed segment for the processed vehicles. Observed queue lengths are recorded for vehicles that enter the simulation model. Unmet demand is assumed to be the additional vehicle queue in the real world that would be added to the end of the observed queue in the model. Once the Vissim models were calibrated, traffic was adjusted to 2023 by adding the No Action Alternative incremental volume[17] derived from the No Action Alternative BPM to evaluate the No Action Alternative traffic conditions. Measures of performance included traffic density, speed, delays, and LOS.

For the highway analysis, the Vissim modeling focused on the 3 weekday peak 1-hour periods (AM, midday [MD], and PM) in the Manhattan-bound direction where queuing and delays on the highway network would be expected to be the most severe for the tolling scenario with the largest increases in traffic. The peak 1-hour period for the AM, MD, and PM periods vary by highway corridor and are not the same for each corridor. These models produce density outputs that enabled the evaluation of the increase in density and delays between the No Action Alternative and the CBD Tolling Alternative.

HIGHWAY CAPACITY SOFTWARE ANALYSIS

HCS[18] analyses were performed along three highways where existing speeds were about 40 mph or higher during the AM, MD, and PM peak hours:

- RFK-Queens leg
- Bayonne Bridge
- New Jersey Turnpike (I-95) Eastern Spur

The HCS provides density, LOS, speed, and measures of performance where the LOS is E or better. At LOS F, the HCS does not provide speed and density as outputs.

16 Processed traffic volumes is a measure of performance representing the ability of a roadway to meet traffic demand. When the processed volume is less than the traffic demand, the excess volume is converted to queues which result in increased travel times.

17 Incremental volumes were added to the No Action Alternative condition to account for network changes implemented by NYCDOT including a dedicated bike lane on the Brooklyn Bridge, a dedicated bike lane on the Ed Koch Queensboro Bridge, geometric changes at some intersections, and the reduction in travel lanes along portions of the BQE from three lanes to two lanes in each direction.

18 The Highway Capacity Software (HCS) is a macroscopic traffic simulation software that implements the methodology in the *Highway Capacity Manual* (HCM) 6th Edition. This tool is useful when speeds are generally 40 mph or higher. It provides LOS, speed, and density as measures of performance. At LOS F, this software does not provide useful output and, therefore, cannot be used effectively under congested conditions.

SUMMARY OF ANALYTICAL TOOLS AND CRITERIA USED TO DETERMINE ADVERSE EFFECTS

Table 4B-3 summarizes the analytical tools and the criteria used to determine adverse effects for the 10 highway study locations.

Table 4B-3. Analysis Type and Criteria Used for the Determination of Adverse Effects

ANALYSIS LOCATION[1]	CHANGE IN VOLUME (SEQRA)	NO ACTION SPEED AT FACILITY	PASS SCREENING	ANALYSIS TYPE	RESULT OF ADDITIONAL ANALYSIS	CRITERIA USED TO DETERMINE ADVERSE EFFECT	ADVERSE EFFECT
Holland Tunnel	Traffic volumes decrease	20 mph	Yes	No further analysis	N/A volumes decreased	5% volume increase	No
Lincoln Tunnel	Traffic volumes decrease	20 mph	Yes	No further analysis	N/A Volumes decreased	5% volume increase	No
QMT/LIE	5%	20 mph	No	Vissim model	Up to 4 min additional delay	2.5 minutes of increased delay	Yes
HCT	5%	20 mph	No	Vissim model	Up to 2.3 min additional delay	2.5 minutes of increased delay	No
VNB/SIE	10%	20 mph	No	Vissim model	10 second increase in delay	2.5 minutes of increased delay	No
CB /TME	5%	20 mph	No	SEQRA Volume Threshold	No additional analysis	5% volume increase	Yes
FDR Drive	5%	20 mph	No	SEQRA Volume Threshold	No additional analysis	5% volume increase	Yes
RFK Bridge	10%	20 mph	No	HCS	Minor changes in density/speed	2.5 minutes of increased delay	No
Bayonne Bridge	10%	20 mph	No	HCS	Minor changes in density/speed	2.5 minutes of increased delay	No
Eastern Spur of NJ Turnpike	10%	20 mph	No	HCS	Minor changes in density/speed	2.5 minutes of increased delay	No

Source: WSP, 2022.

1 QMT-Queens-Midtown Tunnel; LIE-Long Island Expressway; HCT-Hugh L. Carey Tunnel; VNB-Verrazzano-Narrows Bridge; SIE-Staten Island Expressway; CBX-Cross Bronx Expressway; TME-Trans-Manhattan Expressway.

* For HCS analyses, it is assumed that additional delays along the corridor are less than 2.5 minutes if speeds remain at 40 mph and above.

Vissim models were available at five study locations: Lincoln Tunnel, Holland Tunnel, Queens-Midtown Tunnel-Long Island Expressway corridor, the Hugh L. Carey Tunnel-Gowanus corridor, and Verrazzano-Narrows Bridge-Staten Island Expressway corridor. Two of the study locations, the Holland Tunnel and Lincoln Tunnel, were dropped from further analysis because the volume changes were found to be negative for all tolling scenarios and there would not be an increase in delay. The remaining three Vissim study

locations were analyzed in detail using an increase in delay of greater than or equal to 2.5 minutes as the primary criterion for determining adverse effects, although other factors such as speed, queue length, and density were also taken into consideration.

Three study locations were determined to be appropriate for the HCS model where speeds were 40 mph or higher: the RFK–Queens leg, the Bayonne Bridge, and the eastern spur of the New Jersey Turnpike. These locations were also evaluated using a greater than or equal to 2.5 minutes additional delay threshold as the primary criterion for the determination of adverse traffic effects along with other criteria such as LOS, speed, and density. (Note: If speeds remained greater than 40 mph under the CBD Tolling Alternative it was assumed that delays would be under 2.5 minutes for the entire corridor).

The remaining two study locations, the Trans-Manhattan/Cross Bronx Expressway and the FDR Drive between the Williamsburg Bridge and the Brooklyn Bridge, did not have an available Vissim model and the HCS was not an appropriate tool under congested conditions. Therefore, the analysis at these two locations defaulted to the SEQRA volume threshold of greater than 5 percent increase in traffic volumes under congested conditions (less than 20 mph) to determine adverse effects.

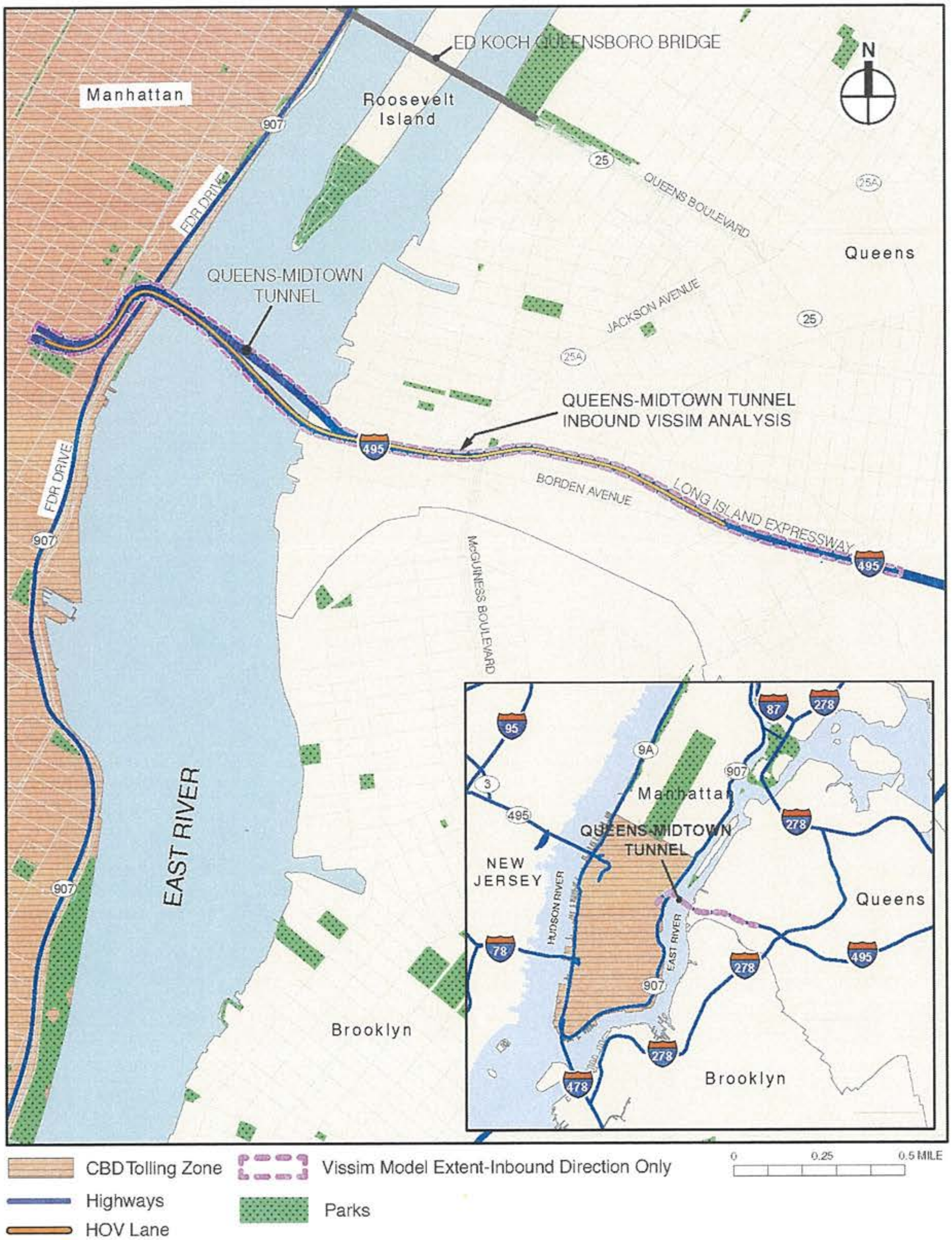
4B.4.2 Long Island Expressway (I-495) Leading to the Queens-Midtown Tunnel

The Queens-Midtown Tunnel connects the boroughs of Manhattan and Queens. The tunnel is designated as NY-495 and in Queens, leads directly to and from the Long Island Expressway (I-495) at the junction with the BQE (I-278), although the section from the Queens-Midtown Tunnel to Queens Boulevard in Queens is known as the Queens-Midtown Expressway, and the section between Queens Boulevard and the Queens-Nassau County line is known as the Horace Harding Expressway. The tunnel has two tubes, an inbound and outbound tube, each with two travel lanes. A contra-flow Bus/3+ HOV lane operates westbound in the morning from 6:00 a.m. to 10:00 a.m. from Van Dam Street to Queens-Midtown Tunnel and then along the south tube of the tunnel into Manhattan, providing three travel lanes to Manhattan during this time. **Figure 4B-3** depicts the location of the highways leading to the Queens-Midtown Tunnel and highlights the extent of the microsimulation model area for the Queens-Midtown Expressway/I-495 analysis.

AFFECTED ENVIRONMENT

Consistent with other highway analyses for this Project, the highway segment analysis was performed using a Vissim model, which incorporated volume data from TBTA toll transaction data and was calibrated based on traffic counts and observed speeds using data provided by StreetLight Data, Inc. (a third-party, on-demand mobility analytics platform that provides past traffic information). Collectively, the TBTA transaction data and data provided by StreetLight Data, Inc. provided performance metrics including hourly volume, travel speed in miles per hour (mph). The data were used to calculate maximum queue length (in feet), density (in passenger cars per mile per lane), and overall LOS. For this microsimulation model, the maximum queue length is based on length of roadway occupied by vehicles not moving or moving below a speed of approximately 6 mph. **Table 4B-4** presents a summary of the existing conditions during the weekday AM, MD, and PM peak hours.

Figure 4B-3. Highways Leading to the Queens-Midtown Tunnel



Source: ESRI, NYC Open Data, NYMTC 2020 TransCAD Highway Network.

Table 4B-4. Existing Conditions: Long Island Expressway (I-495): The Queens-Midtown Tunnel

PERFORMANCE (2019)	AM (8 a.m. to 9 a.m.)	MD (1 p.m. to 2 p.m.)	PM (5 p.m. to 6 p.m.)
Hourly Volume (vehicles)			
I-495 Inbound, Mainline	2,672	2,581	2,714
I-495 Inbound, High-Occupancy Vehicle (HOV)–AM only	940	—	—
Processed Hourly Volume (vehicles)			
I-495 Inbound, Mainline	2,436	2,396	2,311
I-495 Inbound, HOV–AM only	940	—	—
Travel Time (min:sec)			
I-495 Inbound, Mainline	05:44	05:09	08:59
I-495 Inbound, HOV–AM only	01:19	—	—
Travel Speed (miles per hour)			
I-495 Inbound, Mainline	8.7	9.7	5.6
I-495 Inbound, HOV–AM only	40.8	—	—
Maximum Queue (feet)			
I-495 Inbound, Mainline	3,987	4,464	5,824
I-495 Inbound, HOV–AM only	2	—	—
Density (pc/mi/ln)			
I-495 Inbound, Mainline	78	72	133
I-495 Inbound, HOV–AM only	22	—	—
Level of Service (LOS)			
I-495 Inbound, Mainline	F	F	F
I-495 Inbound, HOV–AM only	C	—	—

Source: WSP, 2022.
* Processed volume is the volume actually handled by the Vissim model and is used for calibration purposes to make sure the model is set to actual traffic. For future conditions, the processed volume is a performance measure and unprocessed volumes create backups and longer queues.

Based on the October 2019, transaction data provided by TBTA, the highest average weekday hourly traffic volume of 3,612 vehicles (2,672 vehicles in the two inbound general-purpose lanes plus 940 vehicles in the contra-flow HOV lane) occurred along the Long Island Expressway (I-495) at the eastern portal of the Queens-Midtown Tunnel in the Manhattan-bound direction during the AM peak hour (8:00 a.m. to 9:00 a.m.).

Other hourly Manhattan-bound traffic volumes at the Queens-Midtown Tunnel include 2,581 vehicles and 2,714 vehicles during the MD peak hour (1:00 p.m. to 2:00 p.m.) and the PM peak hour (5:00 p.m. to 6:00 p.m.), respectively.

Travel speeds approaching the Queens-Midtown Tunnel depend upon the time of day. In the Manhattan-bound direction, speeds along the Long Island Expressway (I-495) at the eastern portal of the Queens-Midtown Tunnel during the AM peak hour averaged approximately 9 mph on the mainline lanes and approximately 41 mph on the contra-flow HOV lane, which operates only during the morning peak period. During the MD and PM peak hours, speeds in the Manhattan-bound direction on the mainline lanes were approximately 10 mph and 6 mph, respectively.

The maximum queue lengths along the Long Island Expressway (I-495) in the Manhattan-bound direction as measured east of the Queens-Midtown Tunnel portal in the microsimulation model, are approximately 3,987 feet, 4,464 feet, and 5,824 feet during the AM, MD, and PM peak hours, respectively.

The existing LOS varies from LOS C on the HOV lane during the AM peak hour to LOS F on the mainline lanes during all peak hours of a typical weekday day.

ENVIRONMENTAL CONSEQUENCES

Table 4B-5, Table 4B-6, and Table 4B-7 present the results of the Vissim analysis for the weekday AM, MD, and PM peak hours, respectively, for Tolling Scenario D, which is representative of the tolling scenarios, including Tolling Scenarios E and F. The assessment describes the incremental change between the No Action Alternative and the CBD Tolling Alternative.

The highway analysis of the Queens-Midtown Tunnel and its approaches indicated that under Tolling Scenario D, there would be relatively small increases in traffic during the AM and PM peak hours due to capacity constraints and a larger increase in traffic during the MD peak hour. The LOS at critical locations during the weekday AM, MD, and PM peak hours are projected to remain the same (at LOS F). The most notable change is expected to occur in the MD peak hour where travel speeds would potentially drop from about 11.8 to 6.0 mph and the travel times would potentially increase by about 4 minutes.

Under the SEQRA criteria the increase in traffic volumes would be within a 5 percent threshold during the AM peak hour with an increase of 125 vehicles. However, during the MD and PM peak hours, the increase in volume of 383 and 203 vehicles, respectively, would exceed a 5 percent threshold. However, the ***[threshold of less than]*** 2.5 minutes of additional delay is exceeded only during the MD peak hour.

AM Results (8:00 a.m. to 9:00 a.m.)

With CBD tolling, traffic in the Manhattan-bound direction is projected to increase by approximately 125 vehicles leading into the Queens-Midtown Tunnel. This would likely result in an increase in travel time during the AM peak of approximately 137 seconds in the mainline lanes, with the travel time in the HOV lane remaining the same as the No Action Alternative. Speeds are anticipated to decrease by 2.7 mph, from 9.1 mph to 6.4 mph, on the mainline lanes, while speeds on the HOV lane would remain the same as the No Action Alternative. Queues are expected to increase by approximately 1,719 feet (or approximately 86 vehicles) along the Long Island Expressway (I-495) mainline with no increase in the queue length expected for the HOV lane. The density along the Long Island Expressway (I-495) mainline lanes is expected to increase by approximately 39 pc/mi/ln and the LOS service would remain at LOS F. (The HOV lane would continue to operate at LOS C and the density is projected to remain the same as the No Action Alternative). Under the SEQRA criteria, the projected increase in traffic of 125 vehicles during the AM peak hour would be within a 5 percent increase and the additional delay of 2.2 minutes is less than the 2.5 minutes threshold; therefore, there would not be an adverse traffic effect during the AM peak hour.

MD Results (1:00 p.m. to 2:00 p.m.)

With CBD tolling, traffic volumes in the Manhattan-bound direction are projected to increase by approximately 383 vehicles on the mainline lanes. This is projected to result in an increase of approximately 242 seconds in travel time and speeds are projected to decrease by 5.8 mph, from 11.8 mph to 6.0 mph.

The maximum queue length is expected to increase by approximately 1,355 feet (or approximately 68 vehicles) along the Long Island Expressway (I-495) and the density is expected to increase approximately 76 pc/mi/ln. The LOS is expected to remain at LOS F. Under the SEQRA criteria, the projected increase in traffic of 383 vehicles during the MD peak hour would exceed 5 percent and the increased delay of 4.0 minutes would exceed the ***[delay threshold of less than]*** 2.5 minutes; therefore, there would be a potential adverse traffic effect during the MD peak hour.

Table 4B-5. Long Island Expressway (I-495) Approach to Queens-Midtown Tunnel – AM (8:00 a.m. to 9:00 a.m.)

PERFORMANCE (2023)	NO ACTION ALTERNATIVE	CBD TOLLING ALTERNATIVE (Tolling Scenario D)	INCREMENTAL CHANGE
Hourly Volume (vehicles)			
I-495 Inbound, Mainline	2,680	2,805	125
I-495 Inbound, High-Occupancy Vehicle (HOV) – AM only	940	940	0
Processed Hourly Volume (vehicles)			
I-495 Inbound, Mainline	2,432	2,434	2
I-495 Inbound, HOV – AM only	942	943	1
Travel Time (min:sec)			
I-495 Inbound, Mainline	05:31	07:48	02:17
I-495 Inbound, HOV – AM only	01:19	01:19	00:00
Travel Speed (miles per hour)			
I-495 Inbound, Mainline	9.1	6.4	-2.7
I-495 Inbound, HOV – AM only	40.9	40.9	0.0
Maximum Queue (feet)			
I-495 Inbound, Mainline	3,981	5,700	1,719
I-495 Inbound, HOV – AM only	6	6	0
Density (pc/mi/ln)			
I-495 Inbound, Mainline	74	113	39
I-495 Inbound, HOV – AM only	23	23	0
Level of Service (LOS)			
I-495 Inbound, Mainline	F	F	—
I-495 Inbound, HOV – AM only	C	C	—

Source: WSP, 2022.
Note: Tolling Scenarios E and F results are expected to be similar to Tolling Scenario D.
* Processed volume is the volume actually handled by the Vissim model and is used for calibration purposes to make sure the model is set to actual traffic. For future conditions, the processed volume is a performance measure and unprocessed volumes create backups and longer queues.

Table 4B-6. Long Island Expressway (I-495) Approach to Queens-Midtown Tunnel – MD (1:00 p.m. to 2:00 p.m.)

PERFORMANCE (2023)	NO ACTION ALTERNATIVE	CBD TOLLING ALTERNATIVE (Tolling Scenario D)	INCREMENTAL CHANGE
Hourly Volume (vehicles)			
I-495 Inbound, Mainline	2,594	2,977	383
Processed Hourly Volume (vehicles)			
I-495 Inbound, Mainline	2,444	2,490	46
Travel Time (min:sec)			
I-495 Inbound, Mainline	04:15	08:17	04:02
Travel Speed (miles per hour)			
I-495 Inbound, Mainline	11.8	6.0	-5.8
Maximum Queue (feet)			
I-495 Inbound, Mainline	3,505	4,860	1,355
Density (pc/mi/ln)			
I-495 Inbound, Mainline	55	131	76
Level of Service (LOS)			
I-495 Inbound, Mainline	F	F	—

Source: WSP, 2022.
Note: Tolling Scenarios E and F results are expected to be similar to Tolling Scenario D.
* Processed volume is the volume actually handled by the Vissim model and is used for calibration purposes to make sure the model is set to actual traffic. For future conditions, the processed volume is a performance measure and unprocessed volumes create backups and longer queues.

Table 4B-7. Long Island Expressway (I-495) Approach to Queens-Midtown Tunnel – PM (5:00 p.m. to 6:00 p.m.)

PERFORMANCE (2023)	NO ACTION ALTERNATIVE	CBD TOLLING ALTERNATIVE (Tolling Scenario D)	INCREMENTAL CHANGE
Hourly Volume (vehicles)			
I-495 Inbound, Mainline	2,687	2,890	203
Processed Hourly Volume (vehicles)			
I-495 Inbound, Mainline	2,309	2,340	31
Travel Time (min:sec)			
I-495 Inbound, Mainline	08:27	09:45	01:18
Travel Speed (miles per hour)			
I-495 Inbound, Mainline	5.9	5.1	-0.8
Maximum Queue (feet)			
I-495 Inbound, Mainline	5,859	5,872	13
Density (pc/mi/ln)			
I-495 Inbound, Mainline	127	141	14
Level of Service (LOS)			
I-495 (Inbound, Mainline)	F	F	—

Source: WSP, 2022.
Note: Tolling Scenarios E and F results are expected to be similar to Tolling Scenario D.
* Processed volume is the volume actually handled by the Vissim model and is used for calibration purposes to make sure the model is set to actual traffic. For future conditions, the processed volume is a performance measure and unprocessed volumes create backups and longer queues.
** Maximum queue length is constrained by the extent of the Vissim model. Actual increase in queue length is estimated at about 1,500 feet. This is based on an additional 203 vehicles accommodated in three lanes and 22-foot average vehicle spacing (15-foot average vehicle length and 7-foot average vehicle separation)

PM Results (5:00 p.m. to 6:00 p.m.)

With CBD tolling, Manhattan-bound direction traffic volumes are projected to increase by approximately 203 vehicles on the mainline lanes. This would likely result in an increase of approximately 78 seconds in travel time and speeds are anticipated to decrease slightly. Maximum queues are constrained by the extent of the Vissim model but are projected to increase by about 1,500 feet, assuming an additional 203 vehicles accommodated in three lanes and 22-foot vehicle spacing (15-foot average vehicle length and 7foot separation between vehicles). Queue delays are projected to increase, but these additional queue delays would likely occur east of Van Dam Street, which is outside of the model limits. Density is projected to increase by approximately 14 pc/mi/ln with the LOS remaining at LOS F. Under the SEQRA criteria, the projected increase in traffic of 203 vehicles during the PM peak hour would exceed the 5 percent *[threshold]* but the increase in delay would be 1.3 minutes which would be below the *[delay threshold of]* 2.5 minutes; therefore, there would not be an adverse traffic effect during the PM peak hour.

In summary, under Tolling Scenario D, traffic volumes would increase by 125/383/203 vehicles during the AM, MD, and PM peak hours, respectively, resulting in increased queue lengths and delays for all peak hours. Under the SEQRA criteria, assuming a potential adverse effect if traffic volumes increase more than 5 percent under congested conditions and delays increase by 2.5 minutes or more, there would be a potential adverse effect in the MD peak hour but no adverse effect during the AM and PM peak hours.

Adverse effects that would arise if Tolling Scenario D or another similar tolling scenario were implemented will be minimized through implementing Transportation Demand Management measures such as ramp metering, motorist information, signage, and/or targeted toll policy modifications to reduce diversions. The Project Sponsors will undertake monitoring of traffic patterns specifically tailored to the adopted tolling scenario—commencing prior to implementation with data collection approximately 3 months after the start of Project operations—to determine whether the predicted adverse effects are occurring and to determine the appropriate Transportation Demand Management measures (or improvement in existing Transportation Demand Management measures) to be implemented. The monitoring program will examine changes in traffic volumes, changes in speeds, and changes in delays along the affected highway corridors. Volume changes will be determined from before/after traffic counts (where available); speed changes will be determined from actual before/after speeds based on data provided by StreetLight Data, Inc.; and the change in delay along major highway corridors will be determined based on actual speeds based on data provided by StreetLight Data, Inc. The monitoring program will inform the development and implementation of appropriate Transportation Demand Management measures and ***[subsequently]*** possible adjustments to the tolling policy should traffic volumes increase by more than 5 percent and delays increase ***[by]*** 2.5 minutes ***[or more]***.

4B.4.3 Gowanus Expressway Leading to I-278 Hugh L. Carey Tunnel

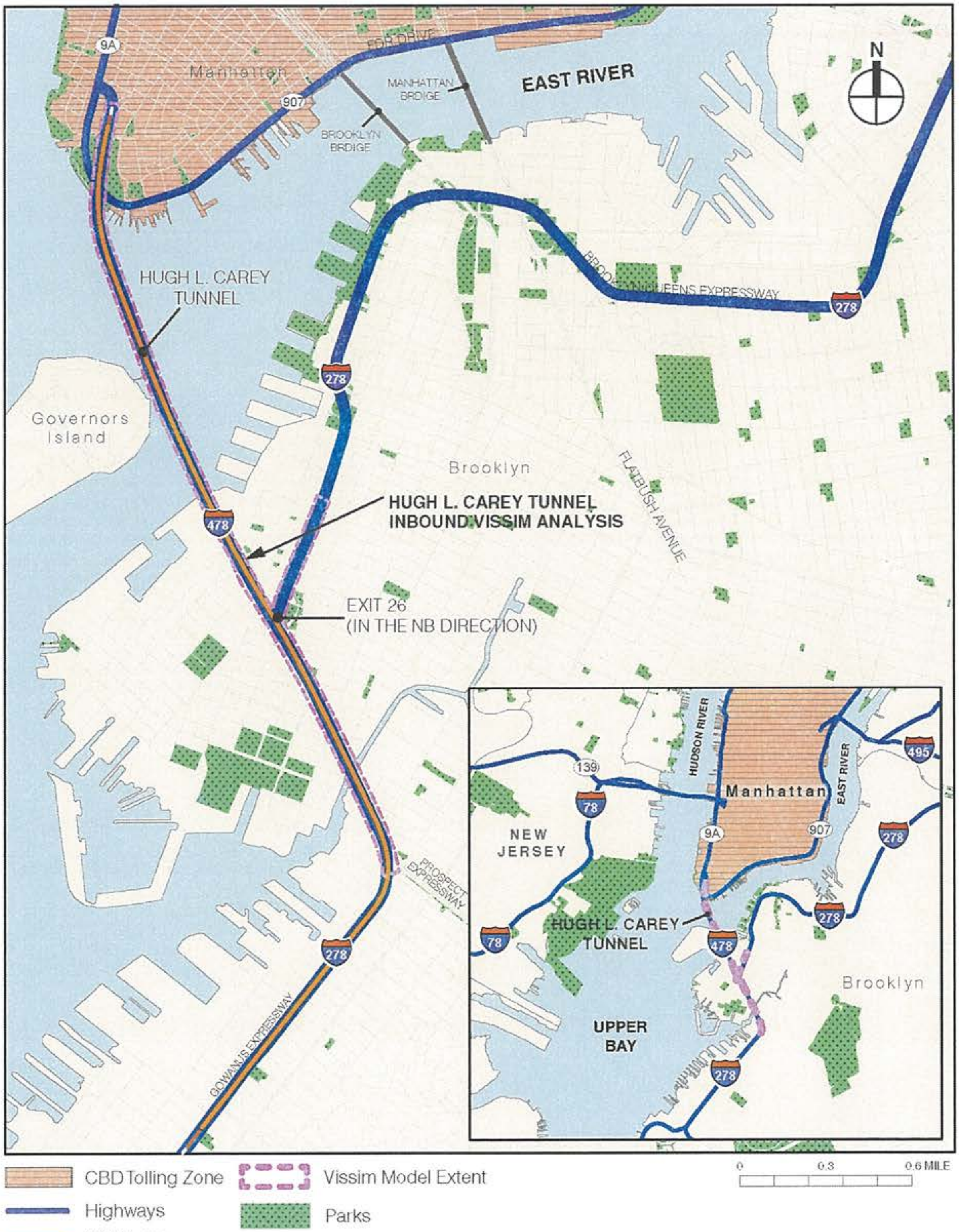
The Hugh L. Carey Tunnel consists of two tubes—each with two traffic lanes—one tube for each direction. The eastern tunnel portal is in the neighborhood of Red Hook in Brooklyn and the western portal is north of Battery Park in Lower Manhattan.

The Hugh L. Carey Tunnel is part of the Interstate Highway System, designated as I-478, and encompasses the length of the tunnel and the short highway connection to I-278. The I-278 designation is applied to several expressways, including the Gowanus Expressway in southern Brooklyn and BQE across northern Brooklyn and Queens. During the weekday AM peak period, an HOV lane operates along the eastbound Gowanus Expressway toward the Hugh L. Carey Tunnel, for a total of three lanes toward Manhattan. During the weekday PM peak period the HOV lane operates in the reverse direction, westbound, along the Gowanus Expressway, for a total of three lanes toward Brooklyn. At all other times, two travel lanes operate both east and west. **Figure 4B-4** presents the location of the highways leading to and from the Hugh L. Carey Tunnel.

AFFECTED ENVIRONMENT

The highway segment analysis was performed using a Vissim model calibrated using existing speeds based on data provided by StreetLight Data, Inc. The model provides performance metrics including hourly processed volumes, travel time (in seconds), travel speed (in miles per hour), maximum queue length (in feet), density (in passenger cars per mile per lane), and overall LOS. **Table 4B-8** presents a summary of existing conditions during the weekday AM, MD, and PM peak hours.

Figure 4B-4. Highways Leading to the Hugh L. Carey Tunnel



Source: ESRI, NYC Open Data, NYMTC 2020 TransCAD Highway Network.

Table 4B-8. Existing Conditions: Gowanus Expressway Leading to Hugh L. Carey Tunnel

PERFORMANCE (2019)	AM (8 a.m. to 9 a.m.)	MD (1 p.m. to 2 p.m.)	PM (5 p.m. to 6 p.m.)
Hourly Volume			
Total Volume to Hugh L. Carey Tunnel	2,953	1,551	1,205
Total Volume to Brooklyn-Queens Expressway (BQE)	1,308	2,528	2,964
Total Volume Weaving Segment	2,453	3,615	3,759
Travel Time (min:sec)			
Gowanus to BQE Off-Ramp, Weaving Segment	03:53	03:43	04:54
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	02:04	01:37	01:35
High-Occupancy Vehicle Lane	02:56	—	—
Travel Speed (miles per hour)			
Gowanus to BQE Off-Ramp, Weaving Segment	11.6	12.5	9.8
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	13.8	17.8	18.0
High-Occupancy Vehicle Lane	17.0	—	—
Maximum Queue (feet)			
Gowanus to BQE Off-Ramp, Weaving Segment	6,555	4,687	7,006
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	1,756	158	294
High-Occupancy Vehicle Lane	0	—	—
Density (pc/mi/ln)			
Gowanus to BQE Off-Ramp, Weaving Segment	77	87	93
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	34	25	15
High-Occupancy Vehicle Lane	56	—	—
Level of Service (LOS)			
Gowanus to BQE Off-Ramp, Weaving Segment	F	F	F
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	D	C	B
High-Occupancy Vehicle Lane	F	—	—

Source: WSP, 2022.

The highest average weekday hourly traffic volume of 2,953 vehicles, based upon October 2019 data provided by TBTA, occurs in the Manhattan-bound direction during the AM peak hour (8:00 a.m. to 9:00 a.m.). Other hourly Manhattan-bound traffic volumes at the Hugh L. Carey Tunnel are 1,551 vehicles and 1,205 vehicles in the MD peak hour (1:00 p.m. to 2:00 p.m.) and PM peak hour (5:00 p.m. to 6:00 p.m.), respectively.

The speeds in the Hugh L. Carey Tunnel vary by the time of day. In the Manhattan-bound direction the slowest speeds along I-478 at the eastern portal of the Hugh L. Carey Tunnel are during the AM peak hour, averaging 13.8 mph. During the MD and PM peak hours, speeds in the Manhattan-bound direction on the same segment are 17.8 mph and 18.0 mph, respectively. The average Manhattan-bound speeds along the most critical segment—the I-478 weaving segment between the merge of the Gowanus Expressway with the Prospect Expressway, over Hamilton Avenue, to the exit ramp to the BQE and Hamilton Avenue (Exit 26)—are 11.6 mph, 12.5 mph, and 9.8 mph during the AM, MD, and PM peak hours, respectively. In

the HOV lane, which operates in the Manhattan-bound direction during the AM peak period, vehicles move at an average speed of 17 mph.

The maximum queue lengths along I-478 as measured east from the Hugh L. Carey Tunnel portal segment after the exit ramp to the BQE (Exit 26 to Hamilton Avenue access to the Hugh L. Carey Tunnel entrance) are approximately 1,756 feet, 158 feet, and 294 feet during the AM, MD, and PM peak hours, respectively. The maximum queue lengths along I-478 measured on the weaving segment between the merge from Gowanus/Prospect Expressways and the exit ramp to the BQE are approximately 6,555 feet, 4,687 feet, and 7,006 feet during the AM, MD, and PM peak hours, respectively.

Three locations on the Manhattan-bound tunnel approach show the existing LOS varies from LOS B to LOS F. The I-478 weaving section before the exit ramp to the BQE on the approach to the Hugh L. Carey Tunnel operates at LOS F during the AM, MD, and PM peak hours. The section along the I-478 segment between the exit ramp to the BQE and the eastern portal of the Hugh L. Carey Tunnel operates at LOS D, LOS C, and LOS B during the AM, MD, and PM peak hours, respectively. The HOV lane operates at LOS F at about 17 miles per hour without queues.

ENVIRONMENTAL CONSEQUENCES

For the 2023 No Action Alternative and 2023 CBD Tolling Alternative (Tolling Scenario D), **Table 4B-9, Table 4B-10,** and **Table 4B-11** present results of the Vissim assessment for the weekday AM, MD, and PM peak hours, respectively. The assessment summarized below describes the incremental change between the No Action Alternative and CBD Tolling Alternative.

Overall, the highway analysis of the Hugh L. Carey Tunnel and its approaches indicates that under Tolling Scenario D, there would likely be a change in travel patterns and an increase in traffic that would result in increased travel times, higher densities, and deteriorating LOS, thereby creating potential adverse traffic effects under the SEQRA criteria.

The change in traffic patterns resulting from the CBD Tolling Alternative is expected to result in a shift of traffic from the BQE to the Hugh L. Carey Tunnel in the critical weaving section between the merge of the Gowanus and Prospect Expressways and the Hugh L. Carey Tunnel split from the BQE based on the route choice of the tunnel versus other East River crossings. The anticipated decrease in volume on the BQE would improve its operation while the increase in volume to the Hugh L. Carey Tunnel would be expected to result in increased delays at the tunnel approach. The change in traffic volumes during the AM and PM peak hours are expected to be small due to capacity constraints at the Hugh L. Carey Tunnel while larger changes in volumes are expected during the MD peak hour. **Table 4B-9, Table 4B-10,** and **Table 4B-11** provide a summary of the results by peak hour.

Table 4B-9. Hugh L. Carey Tunnel – AM (8:00 a.m. to 9:00 a.m.)

PERFORMANCE (2023)	NO ACTION ALTERNATIVE	CBD TOLLING ALTERNATIVE (Tolling Scenario D)	INCREMENTAL CHANGE
Hourly Volume (vehicles)			
Total Volume to Hugh L. Carey Tunnel	3,233	3,305	72
Total Volume to Brooklyn-Queens Expressway (BQE)	1,147	1,105	-42
Total Volume Weaving Segment	2,453	2,453	0
Processed Hourly Volume (vehicles)			
Total Volume to Hugh L. Carey Tunnel	3,521	3,506	-15
Total Volume to BQE	1,294	1,212	-82
Total Volume Weaving Segment	2,821	2,780	-41
Travel Time (min:sec)			
Gowanus to BQE Off-Ramp, Weaving Segment	02:49	04:02	01:13
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	03:10	03:19	00:09
High-Occupancy Vehicle Lane	02:56	02:56	00:00
Travel Speed (miles per hour)			
Gowanus to BQE Off-Ramp, Weaving Segment	15.5	11.2	-4.3
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	9.1	8.7	-0.4
High-Occupancy Vehicle Lane	16.9	16.9	0.0
Maximum Queue (feet)			
Gowanus to BQE Off-Ramp, Weaving Segment	3,691	5,315	1,624
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	2,361	2,377	16
High-Occupancy Vehicle Lane	0	0	—
Density (pc/mi/ln)			
Gowanus to BQE Off-Ramp, Weaving Segment	53	81	28
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	69	78	9
High-Occupancy Vehicle Lane	60	61	1
Level of Service (LOS)			
Gowanus to BQE Off-Ramp, Weaving Segment	F	F	—
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	F	F	—
High-Occupancy Vehicle Lane	F	F	—

Source: WSP, 2022.
Note: Tolling Scenarios E and F results are expected to be similar to Tolling Scenario D.

Table 4B-10. Hugh L. Carey Tunnel – MD (1:00 p.m. to 2:00 p.m.)

PERFORMANCE MEASURES	NO ACTION ALTERNATIVE	CBD TOLLING ALTERNATIVE (Tolling Scenario D)	INCREMENTAL CHANGE
Hourly Volume			
Total Volume to Hugh L. Carey Tunnel	1,867	2,353	486
Total Volume to Brooklyn-Queens Expressway (BQE)	2,248	1,820	-428
Total Volume Weaving Segment	3,615	3,615	0
Processed Hourly Volume			
Total Volume to Hugh L. Carey Tunnel	1,858	2,348	490
Total Volume to BQE	2,320	1,882	-438
Total Volume Weaving Segment	3,639	3,636	-3
Travel Time (min:sec)			
Gowanus to BQE Off-Ramp, Weaving Segment	02:15	02:12	-00:03
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	01:39	01:43	00:04
Travel Speed (miles per hour)			
Gowanus to BQE Off-Ramp, Weaving Segment	19.3	19.8	0.5
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	17.4	16.7	-0.7
Maximum Queue (feet)			
Gowanus to BQE Off-Ramp, Weaving Segment	1,277	201	-1,076
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	374	772	398
Density (pc/mi/ln)			
Gowanus to BQE Off-Ramp, Weaving Segment	47	45	-2
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	33	44	11
Level of Service (LOS)			
Gowanus to BQE Off-Ramp, Weaving Segment	F	E	—
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	D	E	—

Source: WSP, 2022.
Note: Tolling Scenarios E and F results are expected to be similar to Tolling Scenario D.

Table 4B-11. Hugh L. Carey Tunnel – PM (5:00 p.m. to 6:00 p.m.)

PERFORMANCE MEASURES	NO ACTION ALTERNATIVE	CBD TOLLING ALTERNATIVE (Tolling Scenario D)	INCREMENTAL CHANGE
Hourly Volume			
Total Volume to Hugh L. Carey Tunnel	1,302	1,349	47
Total Volume to Brooklyn-Queens Expressway (BQE)	2,877	2,834	-43
Total Volume Weaving Segment	3,759	3,759	0
Processed Hourly Volume			
Total Volume to Hugh L. Carey Tunnel	1,303	1,374	71
Total Volume to BQE	2,852	2,889	37
Total Volume Weaving Segment	3,722	3,815	93
Travel Time (min:sec)			
Gowanus to BQE Off-Ramp, Weaving Segment	03:56	03:07	-00:49
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	01:38	01:41	00:03
Travel Speed (miles per hour)			
Gowanus to BQE Off-Ramp, Weaving Segment	12.4	15.2	2.8
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	17.6	17.1	-0.5
Maximum Queue (feet)			
Gowanus to BQE Off-Ramp, Weaving Segment	4,509	2,828	-1,681
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	423	631	208
Density (pc/mi/ln)			
Gowanus to BQE Off-Ramp, Weaving Segment	84	71	-13
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	18	20	2
Level of Service (LOS)			
Gowanus to BQE Off-Ramp, Weaving Segment	F	F	—
Mainline to Hugh L. Carey Tunnel After Exit 26 (BQE)	C	C	—

Source: WSP, 2022.
Note: Tolling Scenarios E and F results are expected to be similar to Tolling Scenario D.

AM Results (8:00 a.m. to 9:00 a.m.)

Under Tolling Scenario D, traffic volumes to the Hugh L. Carey Tunnel are projected to increase by approximately 72 vehicles while traffic volumes to the BQE are expected to decrease by about 42 vehicles. Traffic volumes in the critical weaving segment between the merge of the Gowanus Expressway and Prospect Expressway to the split to the BQE and the Hugh L. Carey Tunnel are expected to remain about the same. Approximately 42 vehicles would be diverted from the BQE and instead would stay on the main travel way to the Manhattan-bound Hugh L. Carey Tunnel.

This would result in an estimated 73-second increase in travel time in the weaving segment between the merge of the Gowanus/Prospect Expressway and the off-ramp to the BQE. There would be an increase in travel time of approximately 9 seconds between the BQE off-ramp and the eastern portal of the Hugh L. Carey Tunnel due to increased volumes proceeding directly to the tunnel. The travel time in the HOV lane would remain approximately the same. At the eastern portal of the Hugh L. Carey Tunnel, speeds would decrease by about 0.4 mph, while speeds would decrease in the weaving section of the approach between the Gowanus/Prospect Expressway merge and the exit ramp to the BQE by about 4.3 mph.

While total volumes in the weaving segment would be about the same, heavier weaving volumes, from the Prospect Expressway, would result in additional queues in the segment between the Gowanus and Prospect merge and the split to the Hugh L. Carey Tunnel and BQE exit ramp. Under the CBD Tolling Alternative, the queues are anticipated to increase in the weaving segment before the exit ramp to the BQE by about 1,624 feet (or approximately 82 passenger cars) and there would be no queues anticipated along the HOV lane. An increase in density of 28 pc/ln/mi is anticipated for the weave segment. The LOS would remain the same under the CBD Tolling Alternative as the No Action Alternative at LOS F along the general-purpose lanes.

Under SEQRA, the increase in volume would be within 5 percent and the increase in delay of 1.2 minute in the weaving segment would be below 2.5 minutes; therefore, there would not be an adverse traffic effect during the AM peak hour.

MD Results (1:00 p.m. to 2:00 p.m.)

With CBD tolling, traffic volumes in the Hugh L. Carey Tunnel are projected to increase by 486 vehicles and traffic to the BQE is expected to decrease by about 428 vehicles, while total traffic volume on the I-478 weaving segment between the merge of Gowanus/Prospect Expressway and the exit ramp to the BQE would remain about the same.

Travel time in the weaving segment between the merge of Gowanus/Prospect Expressway and the exit ramp to the BQE as well as the approach to the Hugh L. Carey Tunnel would be expected to remain about the same. Overall, at the eastern portal of the Hugh L. Carey Tunnel, speeds would decrease by about 0.7 mph, while there would be improvement in speeds on the weaving section of the approach between the Gowanus/Prospect Expressway merge and BQE off-ramp by about 0.5 mph. Additional queue delays are anticipated and maximum queue lengths on this segment are expected to increase by approximately 398 feet (or approximately 20 vehicles). Reduction in queuing is anticipated in the weaving segment before the exit ramp to the BQE under the CBD Tolling Alternative by about 1,076 feet (or approximately

54 vehicles). Density along the Hugh L. Carey Tunnel approach is expected to increase by 11 pc/mi/ln, and as a result LOS would deteriorate from LOS D to LOS E. A reduction in density is anticipated by 2 pc/mi/ln in the weaving segment before the exit ramp to the BQE and the LOS is projected to improve from LOS F to LOS E.

Under the SEQRA criteria used for the initial evaluation of potential adverse effects, traffic volumes to the Hugh L. Carey Tunnel would increase more than 5 percent, but the detailed Vissim analysis indicates there is sufficient capacity in the tunnel to handle the additional traffic and there would be a minimal increase in delay of a few seconds which would be well below the 2.5 minutes threshold;[19] therefore, there would not be an adverse traffic effect during the MD peak hour.

PM Results (5:00 p.m. to 6:00 p.m.)

With CBD tolling, traffic volumes in the Hugh L. Carey Tunnel are projected to increase by 47 vehicles. The total traffic volume for the critical I-478 weaving segment between the merge of Gowanus/Prospect Expressway and the off-ramp to the BQE would remain about the same. Under the CBD Tolling Alternative, approximately 43 vehicles would no longer use the BQE and would instead shift to the Manhattan-bound Hugh L. Carey Tunnel.

This would result in an estimated 49-second reduction in travel time in the weaving segment between the merge of Gowanus/Prospect Expressway and the off-ramp to the BQE. There is a small, anticipated increase of 3 seconds in travel time between the BQE exit ramp and the eastern portal of the Hugh L. Carey Tunnel. Overall, at the eastern portal of the Hugh L. Carey Tunnel, speeds would decrease by 0.5 mph, while there would be improvement in speeds on the weaving section of the approach between the Gowanus/Prospect Expressway merge and BQE exit ramp by 2.8 mph. Additional queue delays are anticipated and maximum queue lengths at the eastern portal of the Hugh L. Carey Tunnel are expected to increase by approximately 208 feet (or approximately 10 vehicles). Reduction in queuing is anticipated in the weaving segment before the exit ramp to the BQE under the CBD Tolling Alternative by 1,681 feet (or approximately 84 vehicles). At the eastern portal of the Hugh L. Carey Tunnel, density is expected to increase by 2 pc/mi/ln. A reduction in density is anticipated of 13 pc/mi/ln in the weaving segment before the exit ramp to the BQE. The LOS is projected to remain the same under the CBD Tolling Alternative as it would in the No Action Alternative for all segments. The increase in traffic would not exceed 5 percent and there would be a reduction in delays of 49 seconds in the weaving segment; therefore, there would not be an adverse effect during the PM peak hour.

In summary, under Tolling Scenario D, inbound traffic volumes to the Hugh L. Carey Tunnel would increase by 72/486/47 vehicles during the AM, MD, and PM peak hours, respectively, resulting in increased queue lengths and delays for some time periods. Under the SEQRA criteria, assuming an increase in volume within 5 percent under congested conditions would not be considered an adverse effect, there would not be an adverse effect during the AM and PM peak hours. During the MD peak hour, although the 5 percent threshold would be exceeded, further detailed analysis indicates that there would be sufficient capacity in

[19] The capacity of the two inbound lanes is approximately 2,600 vehicles per hour. The projected CBD Tolling Alternative volume under the tolling scenario analyzed would be about 2,353 vehicles, which would be below capacity.

the two inbound lanes to handle the additional traffic volumes and delays would be well below the 2.5-minute threshold; therefore, there would not be an adverse effect during the MD peak hour.

4B.4.4 Staten Island Expressway Leading to the Verrazzano-Narrows Bridge

The Verrazzano-Narrows Bridge is a major regional highway link between Staten Island and Brooklyn, providing connections to the Staten Island Expressway and the Gowanus Expressway (**Figure 4B-5**).

As established by the BPM modeling results of the total trips currently using the bridge in the eastbound direction, only 7 percent are destined to the Manhattan CBD and would be directly affected by the Project.

In the westbound direction, some CBD through trips destined to New Jersey and points beyond are expected to divert to the Verrazzano-Narrows Bridge in order to avoid the CBD toll, resulting in higher westbound traffic volumes.

Based upon the BPM results, there would either be a decrease or a marginal increase in traffic, depending on the peak period, in the eastbound (Brooklyn-bound) direction on the Verrazzano-Narrows Bridge. Therefore, this highway analysis examined only the westbound (Staten Island-bound) direction where potential additional delays and queues would occur along the Staten Island Expressway between the Verrazzano-Narrows Bridge and Hylan Boulevard due to a projected increase in traffic.

Because the Verrazzano-Narrows Bridge would experience an increase in traffic only in the westbound (Staten Island-bound) direction based on traffic projected to navigate around the Manhattan CBD, this highway analysis examined only the westbound direction where potential additional delays and queues would occur along the Staten Island Expressway between the Verrazzano-Narrows Bridge and Hylan Boulevard due to a projected increase in traffic.

AFFECTED ENVIRONMENT

The highway analyses were performed using a calibrated Vissim model specifically modified for the Project along highways that would be expected to experience an increase in traffic and slower speeds.[20] **Table 4B-12** presents a summary of existing conditions during the weekday AM, MD, and PM peak hours.

Based upon October 2019 weekday transaction data provided by TBTA, the heaviest westbound traffic volume occurs during the PM peak hour, with a total of 8,521 vehicles. Traffic volumes during the AM and MD peak hours are lower at 5,789 and 5,425 vehicles, respectively. Typically, the average speeds in the calibrated Vissim model in the westbound direction along the Staten Island Expressway (I278) between the Verrazzano-Narrows Bridge and Hylan Boulevard vary in the range of 18.4 to 29.3 mph during the AM peak hour and 27.0 to 46.7 mph during the MD peak hour. During the PM peak hour, speeds were observed to decrease to the range of 16.8 to 23.7 mph, indicating relatively congested travel conditions during that period.

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20 The model was calibrated using existing speeds provided by StreetLight Data, Inc., hourly traffic counts, and observed queue lengths. Performance measures include processed volumes, speeds, maximum queue length (in feet), density (in passenger cars per mile per lane), and overall LOS.

Figure 4B-5. Highways Leading to/from the Verrazzano-Narrows Bridge

Source: ESRI, NYC Open Data, NYMTC 2020 TransCAD Highway Network.

Table 4B-12. Existing Conditions: Staten Island Expressway (I-278) Westbound – Verrazzano-Narrows Bridge to Hylan Boulevard

PERFORMANCE (2019)	AM (7 a.m. to 8 a.m.)	MD (1 p.m. to 2 p.m.)	PM (4 p.m. to 5 p.m.)
Hourly Volume			
Staten Island Expressway (SIE) Westbound (WB) Upper Level (UL)	2,153	2,656	4,281
SIE WB Lower Level (LL)	2,435	2,445	3,775
SIE WB – High-Occupancy Vehicle UL	1,201	324	465
Travel Time (min:sec)			
Verrazzano-Narrows Bridge merge to Lily Pond WB LL	01:12	00:34	01:03
To Lily Pond WB UL	00:59	00:55	00:56
Lily Pond to Hylan Boulevard WB LL	01:16	00:48	02:05
Lily Pond to Hylan Boulevard WB UL	01:17	00:50	02:14
SIE WB LL to Hylan Boulevard	02:28	01:20	03:10
SIE WB UL to Hylan Boulevard	02:06	01:42	03:06
Travel Speed (miles per hour)			
To Lily Pond WB LL	18.4	38.9	20.4
To Lily Pond WB UL	24.9	27.0	23.7
Lily Pond to Hylan Boulevard WB LL	29.2	46.7	17.3
Lily Pond to Hylan Boulevard WB UL	29.3	45.5	16.8
SIE WB LL to Hylan Boulevard	23.8	44.1	18.3
SIE WB UL to Hylan Boulevard	28.8	35.3	19.1
Density (pc/mi/ln)			
To Lily Pond WB LL	21	13	39
To Lily Pond WB UL	16	22	36
SIE WB LL to Hylan Boulevard	21	14	44
SIE WB UL to Hylan Boulevard	18	13	61
Level of Service (LOS)			
To Lily Pond WB LL	C	B	E
To Lily Pond WB UL	B	C	E
SIE WB LL to Hylan Boulevard	C	B	F
SIE WB UL to Hylan Boulevard	B	B	F

Source: WSP, 2022.

Travel times vary depending on whether the upper or lower level of the bridge is used. Based upon observed travel time data, it took slightly longer for westbound lower-level users to cross the bridge to Hylan Boulevard along the Staten Island Expressway (I-278) during the AM and PM peak hours, when the traffic volumes were higher. Travel times between the Verrazzano-Narrows Bridge and Hylan Boulevard in the calibrated Vissim model were approximately 148 seconds and 190 seconds for the lower-level users during the AM and PM peak, respectively. For those using the upper level, travel times were 126 seconds and 186 seconds during the AM and PM peak, respectively.

The most congested analyzed segment of the westbound Staten Island Expressway (I-278) was between Lily Pond Road and Hylan Boulevard during the PM peak hour, with the lowest observed speeds of approximately 17.3 and 16.8 mph for the lower and upper levels, respectively.

There were no queues observed along the westbound Staten Island Expressway (I-278) between the Verrazzano-Narrows Bridge and Hylan Boulevard throughout all peak hours of the day. The existing LOS on westbound Staten Island Expressway (I-278) between the Verrazzano-Narrows Bridge and Hylan Boulevard is LOS C or better during the AM and MD peak hours, and LOS E and LOS F during the PM peak hour.[21]

ENVIRONMENTAL CONSEQUENCES

Table 4B-13, **Table 4B-14**, and **Table 4B-15** present the Vissim results for the weekday AM, MD, and PM peak hours, respectively for the 2023 No Action and the 2023 CBD Tolling Alternative for Tolling Scenario D, which represents the tolling scenario with the highest increase in traffic.

In summary, the additional traffic volumes on the westbound Staten Island Expressway (I-278) are relatively small during the AM and PM peak hours, and there is sufficient capacity to handle the additional volumes expected under Tolling Scenario D and is not anticipated to result in an adverse effect to highway operations for the AM, MD, and PM peak hours. The relatively small volume changes resulted in insignificant changes across several roadway performance metrics, and thus not all metrics are presented in the table; therefore, there would not be adverse traffic effects for any of the tolling scenarios being considered nor any other tolling scenario adopted that would have lower tolls.

The results for each peak hour are described below.

AM Results (7:00 a.m. to 8:00 a.m.)

With CBD tolling, there would likely be a small increase in traffic during the AM peak hour in the westbound direction on the Verrazzano-Narrows Bridge, with an additional 32 vehicles on the upper level and an additional 64 vehicles on the lower level. Traffic in the HOV lane would likely remain the same. Under the CBD Tolling Alternative, the average speeds along the Staten Island Expressway (I-278) westbound between the Verrazzano-Narrows Bridge and Hylan Boulevard would likely remain in the range of 17.2 to 29.2 mph. There would be no queues between the Verrazzano-Narrows Bridge and Hylan Boulevard resulting from the implementation of the Project, and the LOS would remain the same at LOS C or better. The increase in volume would be small and within a 5 percent increase and the increase in delay of less than 10 seconds would be well below 2.5 minutes; therefore, there would not be an adverse effect during the AM peak hour.

21 Two-way (split) tolling was implemented at the Verrazzano-Narrows Bridge on December 1, 2020. The BPM modeling and the Vissim analyses incorporated the change in toll collection to two-way tolling.

Table 4B-13. Staten Island Expressway (I-278) Westbound—Verrazzano-Narrows Bridge to Hylan Boulevard – AM (7:00 a.m. to 8:00 a.m.)

PERFORMANCE MEASURES	NO ACTION ALTERNATIVE	CBD TOLLING ALTERNATIVE (Tolling Scenario D)	INCREMENTAL CHANGE
Hourly Volume			
Staten Island Expressway (SIE) Westbound (WB) Upper Level (UL)	2,196	2,228	32
SIE WB Lower Level (LL)	2,484	2,548	64
SIE WB – High-Occupancy Vehicle (HOV) UL	1,225	1,225	0
Travel Time (min:sec)			
To Lily Pond WB LL	01:12	01:17	00:05
To Lily Pond WB UL	00:59	01:00	00:01
Lily Pond to Hylan Boulevard WB LL	01:16	01:17	00:01
Lily Pond to Hylan Boulevard WB UL	01:17	01:17	00:00
SIE WB LL to Hylan Boulevard	02:28	02:30	00:02
SIE WB UL to Hylan Boulevard	02:06	02:06	00:00
Travel Speed (miles per hour)			
To Lily Pond WB LL	17.4	17.2	-0.2
To Lily Pond WB UL	24.9	24.8	-0.1
Lily Pond to Hylan Boulevard WB LL	29.1	29.0	-0.1
Lily Pond to Hylan Boulevard WB UL	29.4	29.2	-0.2
SIE WB LL to Hylan Boulevard	23.5	23.5	0.0
SIE WB UL to Hylan Boulevard	28.8	28.7	-0.1
Density (pc/mi/ln)			
To Lily Pond WB LL	23.8	27.0	3.2
To Lily Pond WB UL	16.5	17.4	0.9
SIE WB LL to Hylan Boulevard	21.5	22.8	1.3
SIE WB UL to Hylan Boulevard	18.7	19.7	1.0
Level of Service (LOS)			
To Lily Pond WB LL	C	C	—
To Lily Pond WB UL	B	B	—
SIE WB LL to Hylan Boulevard	C	C	—
SIE WB UL to Hylan Boulevard	B	B	—

Source: WSP, 2022.
Note: Tolling Scenarios E and F results are expected to be similar to Tolling Scenario D.

Table 4B-14. Staten Island Expressway (I-278) Westbound—Verrazzano-Narrows Bridge to Hylan Boulevard – MD (1:00 p.m. to 2:00 p.m.)

PERFORMANCE MEASURES	NO ACTION ALTERNATIVE	CBD TOLLING ALTERNATIVE (Tolling Scenario D)	INCREMENTAL CHANGE
Hourly Volume			
Staten Island Expressway (SIE) Westbound (WB) Upper Level (UL)	2,738	2,939	201
SIE WB Lower Level (LL)	2,533	2,789	256
SIE WB – HOV UL	330	330	0
Travel Time (min:sec)			
To Lily Pond WB LL	00:33	00:34	00:01
To Lily Pond WB UL	00:55	00:55	00:00
Lily Pond to Hylan Boulevard WB LL	00:48	00:48	00:00
Lily Pond to Hylan Boulevard WB UL	00:49	00:50	00:01
SIE WB LL to Hylan Boulevard	01:20	01:20	00:00
SIE WB UL to Hylan Boulevard	01:42	01:43	00:01
Travel Speed (miles per hour)			
To Lily Pond WB LL	40.0	38.7	-1.3
To Lily Pond WB UL	27.0	26.8	-0.2
Lily Pond to Hylan Boulevard WB LL	46.8	46.7	-0.1
Lily Pond to Hylan Boulevard WB UL	45.6	45.4	-0.2
SIE WB LL to Hylan Boulevard	44.1	43.9	-0.2
SIE WB UL to Hylan Boulevard	35.4	35.2	-0.2
Density (pc/mi/ln)			
To Lily Pond WB LL	11	14	3
To Lily Pond WB UL	22	24	2
SIE WB LL to Hylan Boulevard	14	15	1
SIE WB UL to Hylan Boulevard	13	14	1
Level of Service (LOS)			
To Lily Pond WB LL	B	B	—
To Lily Pond WB UL	C	C	—
SIE WB LL to Hylan Boulevard	B	B	—
SIE WB UL to Hylan Boulevard	B	B	—

Source: WSP, 2022.
Note: Tolling Scenarios E and F results are expected to be similar to Tolling Scenario D.

Table 4B-15. Staten Island Expressway (I-278) Westbound—Verrazzano-Narrows Bridge to Hylan Boulevard – PM (4:00p.m. to 5:00p.m.)

PERFORMANCE MEASURES	NO ACTION ALTERNATIVE	CBD TOLLING ALTERNATIVE (Tolling Scenario D)	INCREMENTAL CHANGE
Hourly Volume			
Staten Island Expressway (SIE) Westbound (WB) Upper Level (UL)	4,367	4,442	75
SIE WB Lower Level (LL)	3,850	3,947	97
SIE WB – High-Occupancy Vehicle (HOV) UL	474	474	0
Travel Time (min:sec)			
To Lily Pond WB LL	01:04	01:04	00:00
To Lily Pond WB UL	00:58	00:59	00:01
Lily Pond to Hylan Boulevard WB LL	02:04	02:08	00:04
Lily Pond to Hylan Boulevard WB UL	02:09	02:15	00:06
SIE WB LL to Hylan Boulevard	03:11	03:14	00:03
SIE WB UL to Hylan Boulevard	03:04	03:10	00:06
Travel Speed (miles per hour)			
To Lily Pond WB LL	20.3	20.3	0.0
To Lily Pond WB UL	22.7	22.3	-0.4
Lily Pond to Hylan Boulevard WB LL	17.5	16.9	-0.6
Lily Pond to Hylan Boulevard WB UL	17.5	16.8	-0.7
SIE WB LL to Hylan Boulevard	18.2	17.9	-0.3
SIE WB UL to Hylan Boulevard	19.3	18.7	-0.6
Density (pc/mi/ln)			
To Lily Pond WB LL	37.4	37.7	0.3
To Lily Pond WB UL	37.0	37.7	0.7
SIE WB LL to Hylan Boulevard	42.5	43.5	1.0
SIE WB UL to Hylan Boulevard	59.5	61.6	2.1
Level of Service (LOS)			
To Lily Pond WB LL	E	E	—
To Lily Pond WB UL	E	E	—
SIE WB LL to Hylan Boulevard	F	F	—
SIE WB UL to Hylan Boulevard	F	F	—

Source: WSP, 2022.
Note: Tolling Scenarios E and F results are expected to be similar to Tolling Scenario D.

MD Results (1:00 p.m. to 2:00 p.m.)

Under Tolling Scenario D, an increase in traffic is projected during the MD peak hour in the westbound direction on the Verrazzano-Narrows Bridge with an additional 201 vehicles on the upper level and an additional 256 vehicles on the lower level. Traffic in the HOV lane would likely remain the same. There would be a small reduction in speeds using the lower level or upper level of the Verrazzano-Narrows Bridge, but the change in speeds would not be noticeable. Although the projected increase in traffic volume would be nominally above normal daily fluctuation and would exceed 5 percent there would be sufficient capacity to absorb the additional traffic, with additional delays of less than 10 seconds and the LOS would remain

the same at C or better; therefore, since the increase in delay would be well below the 2.5-minute threshold there would not be an adverse traffic effect under the SEQRA criteria.

PM Results (4:00 p.m. to 5:00 p.m.)

With CBD tolling, an increase in traffic is projected during the PM peak hour in the westbound direction on the Verrazzano-Narrows Bridge, with an additional 75 vehicles on the upper level and 97 vehicles on the lower level. Traffic levels in the HOV lane would remain the same. The average speeds along the Staten Island Expressway (I-278) westbound between the Verrazzano-Narrows Bridge and Hylan Boulevard would remain approximately the same as the No Action Alternative, in the range of 16.8 to 22.3 mph. There would be no increase in queues between the Verrazzano-Narrows Bridge and Hylan Boulevard and densities would be similar. Overall, there would be no change in LOS and increase in delays would be well below the 2.5-minute threshold; therefore, there would be no adverse effects associated with the additional volume during the PM peak hour.

Under Tolling Scenario D, a small increase in traffic is projected during the PM peak hour in the westbound direction on the Verrazzano-Narrows Bridge with an additional 75 vehicles on the upper level and an additional 97 vehicles on the lower level. Traffic in the HOV lane would remain the same. Average speeds under the No Action Alternative range from 16.8 to 22.3 mph. There would be a small reduction in speeds using the lower level or upper level of the Verrazzano-Narrows Bridge, but the change in speeds would be small and not noticeable. The projected increase in traffic volume is small and within 5 percent and the increase in delay would be less than 10 seconds which would be well below the 2.5-minute threshold; therefore, there would not be an adverse traffic effect during the PM peak hour.

In summary, Tolling Scenario D would result in increases in traffic volumes westbound on the Verrazzano-Narrows Bridge during the AM, MD, and PM peak hours of 32/201/75 vehicles at the lower level and 64/256/97 vehicles at the upper level, respectively. These increases in traffic volumes are relatively small and would not have an appreciable effect on travel times, delays, speeds, and densities. The LOS would remain the same during all time periods for all highway segments operating at LOS B/C during the AM and MD peak hours and LOS E/F during the PM peak hour. The increase in delay would be under 10 seconds for all time periods which would be well under the 2.5-minute threshold; therefore, Tolling Scenario D (and Tolling Scenarios E and F), would have no adverse traffic effect along the Verrazzano-Narrows Bridge and the Staten Island Expressway during any time period under the SEQRA criteria. Tolling Scenarios A, B, C, and G, with Lower Manhattan CBD tolls, would be expected to create less diversions than the tolling scenarios with the largest increase in traffic; therefore, these tolling scenarios would also not result in adverse traffic effects.

4B.4.5 I-78 and Route 139 Approach to the Holland Tunnel

The Holland Tunnel is a major gateway between New Jersey and Lower Manhattan with access from I-78 and Route 139, and connections from the New Jersey Turnpike, the Garden State Parkway, and local streets in New Jersey (**Figure 4B-6**).

The highway analysis examined only the Manhattan-bound direction where delays and queues occur along I-78 and Route 139, including the four intersections along 12th Street in Jersey City, just west of the tunnel. The New Jersey-bound traffic was not analyzed because the highways in New Jersey generally operate with less congestion and the volumes are constrained by the tunnel at the Manhattan approaches. However, the Manhattan approaches to the Holland Tunnel are examined as part of the local traffic analysis.

AFFECTED ENVIRONMENT

The highway segment analysis of the existing conditions was performed using a Vissim microsimulation model calibrated to actual volumes and speeds based on data provided by StreetLight Data, Inc. The existing volumes were based on 2019 transaction data. The model provides several important performance metrics including travel time (seconds), travel speed (mph), and maximum queue length (feet).

Table 4B-16 presents a summary of existing conditions during the weekday AM, MD, and PM peak hours. The Vissim network for this highway segment includes intersections in New Jersey that were also analyzed separately using the Synchro traffic model (**Section 4B.6**).

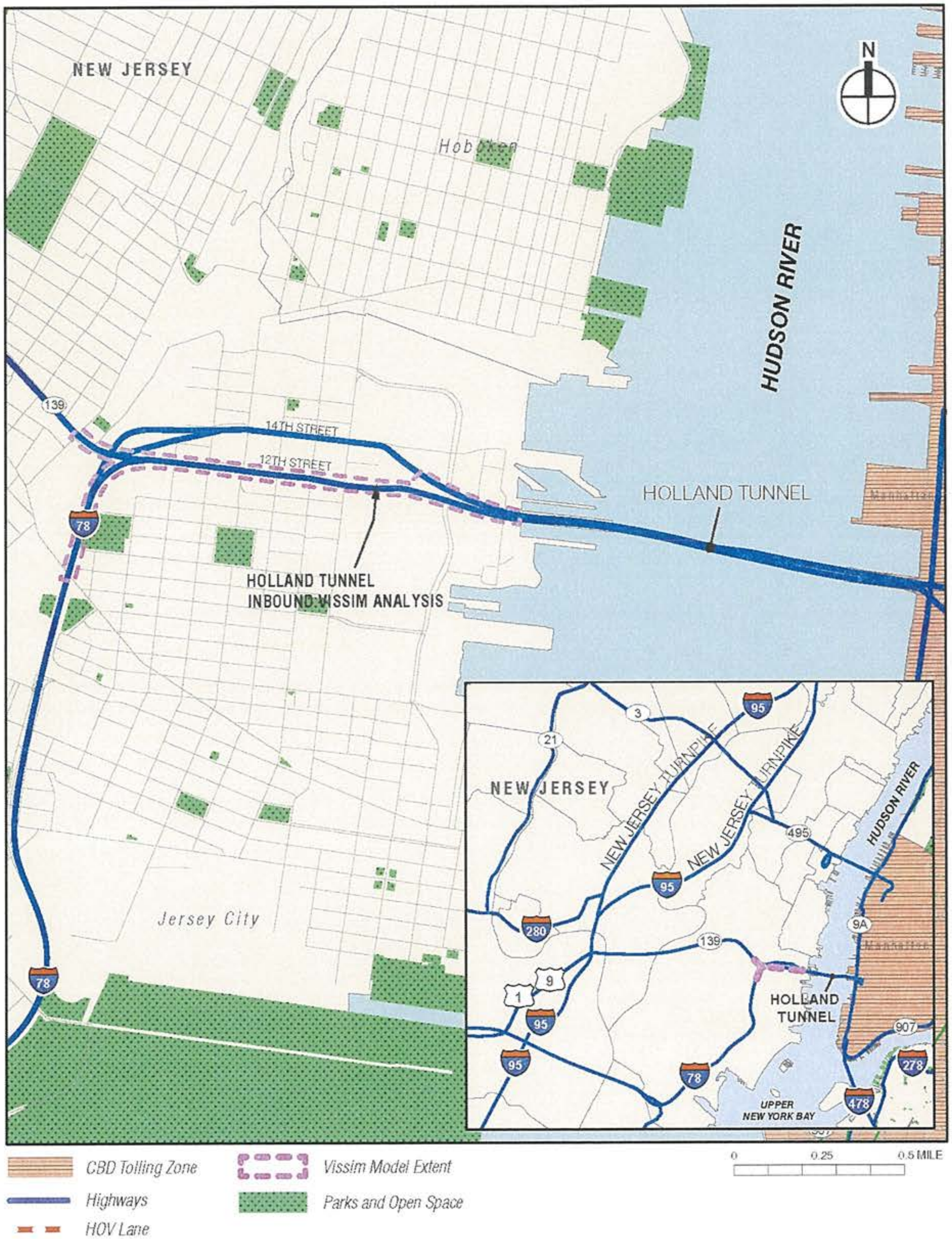
On a typical weekday, the Holland Tunnel carries 86,800 vehicles (41,800 Manhattan-bound and 45,000 New Jersey-bound). The peak hourly Manhattan-bound traffic volumes for the highway approaches are:

- 3,103 AM peak hour
- 2,439 MD peak hour
- 2,977 PM peak hour

The average speeds along I-78 approaching the Holland Tunnel are 7.0 mph, 12.3 mph, and 8.1 mph during the AM, MD, and PM peak hours, respectively. The average speeds along Route 139 approaching the Holland Tunnel are 6.8 mph, 10.9 mph, and 8.6 mph during the AM, MD, and PM peak hours, respectively.

The maximum queue lengths along I78, as measured west from the intersection at Jersey Avenue, are approximately 529 feet, 293 feet, and 444 feet during the AM, MD, and PM peak hours, respectively. The queue lengths along NJ Route 139, also measured from the intersection at Jersey Avenue, are generally much lower in the AM peak hour and there is no queue in the MD and PM peak hours. The signalized arterial roadway segment between Jersey Avenue and the Holland Tunnel portal is typically congested during the AM, MD, and PM peak hours. These intersections along this segment were analyzed using Synchro traffic model and are included in the intersection traffic analysis (**Section 4B.6).**

Figure 4B-6. Highways Leading to the Holland Tunnel



Source: ESRI, NYC Open Data, NYMTC 2020 TransCAD Highway Network.

Table 4B-16. Existing Conditions: I-78 and Route 139

PERFORMANCE (2019)	AM (8 a.m. to 9 a.m.)	MD (Noon to 1 p.m.)	PM (5 p.m. to 6 p.m.)
Hourly Volume			
I-78	1,175	889	1,127
Route 139	1,928	1,550	1,850
Travel Time (min:sec)			
I-78	09:19	05:19	08:05
Route 139 Local	07:53	04:52	06:11
Route 139 Express	08:21	04:59	06:21
Travel Speed (miles per hour)			
I-78	7.0	12.3	8.1
Route 139 Local	6.8	10.9	8.6
Route 139 Express	6.4	10.7	8.4
Maximum Queue (feet)			
I-78	529	293	444
Route 139 Local	114	0	0
Route 139 Express	434	0	0

Source: WS, 2022.

Based upon the results of the BPM regional model for Tolling Scenario D (the tolling scenario that would likely generate the greatest amount of adverse traffic effects), and subsequent post-processing to obtain hourly volumes, there would be a small net decrease in trips across the Holland Tunnel in the Manhattan-bound direction during the AM, MD, and PM peak hours; therefore, a qualitative assessment of potential adverse traffic effects was performed for the No Action Alternative and CBD Tolling Alternative.

ENVIRONMENTAL CONSEQUENCES

For existing conditions and the 2023 No Action Alternative and 2023 CBD Tolling Alternative (Tolling Scenario D), **Table 4B-17** presents a summary of the overall changes in traffic volume. There is little anticipated change between the existing and No Action Alternative conditions and the assessment summarized below describes the incremental change in traffic volumes between the No Action Alternative and CBD Tolling Alternative for the tolling scenario that would likely generate the greatest amount of adverse traffic effects.

Table 4B-17. Holland Tunnel Eastbound Traffic Volumes during AM, MD and PM Peak Hours under Existing Conditions, No Action Alternative, and CBD Tolling Alternative

PEA HOUR	EXISTING CONDITIONS	NO ACTION ALTERNATIVE	CBD TOLLING ALTERNATIVE (TOLLING SCENARIO D)
AM (8:00 a.m. to 9:00 a.m.)	3,103	3,109	3,060
MD (12:00 p.m. to 1:00 p.m.)	2,439	2,431	2,364
PM (5:00 p.m. to 6:00 p.m.)	2,977	2,975	2,912

Source: WSP, 2022.

Under the CBD Tolling Alternative, there would be a small reduction in traffic volumes during the AM, MD, and PM peak hours at the eastbound approaches to the Holland Tunnel and a small improvement in traffic

operations; therefore, there would not be an adverse traffic impact during any peak hour as described below.

AM Results (8:00 a.m. to 9:00 a.m.)

During the AM peak hour, traffic volumes are projected to decrease by a total of 49 vehicles, with approximately 18 vehicles along I-78 and approximately 31 vehicles along NJ Route 139 in the eastbound direction, resulting in a small improvement in traffic operations. Therefore, there would not be an adverse traffic effect during the AM peak hour.

MD Results (12:00 p.m. to 1:00 p.m.)

During the MD peak hour, traffic volumes are projected to decrease by a total of 67 vehicles, with approximately 24 vehicles along I-78 and approximately 43 vehicles along NJ Route 139 in the eastbound direction, resulting in a small improvement in traffic operations. Therefore, there would not be an adverse traffic effect during the MD peak hour.

PM Results (5:00 p.m. to 6:00 p.m.)

During the PM peak hour, traffic volumes are projected to decrease by a total of 63 vehicles, with approximately 24 vehicles along I-78, and approximately 39 vehicles along NJ Route 139 in the eastbound direction, resulting in a small improvement in traffic operations. Therefore, there would not be an adverse traffic effect during the PM peak hour.

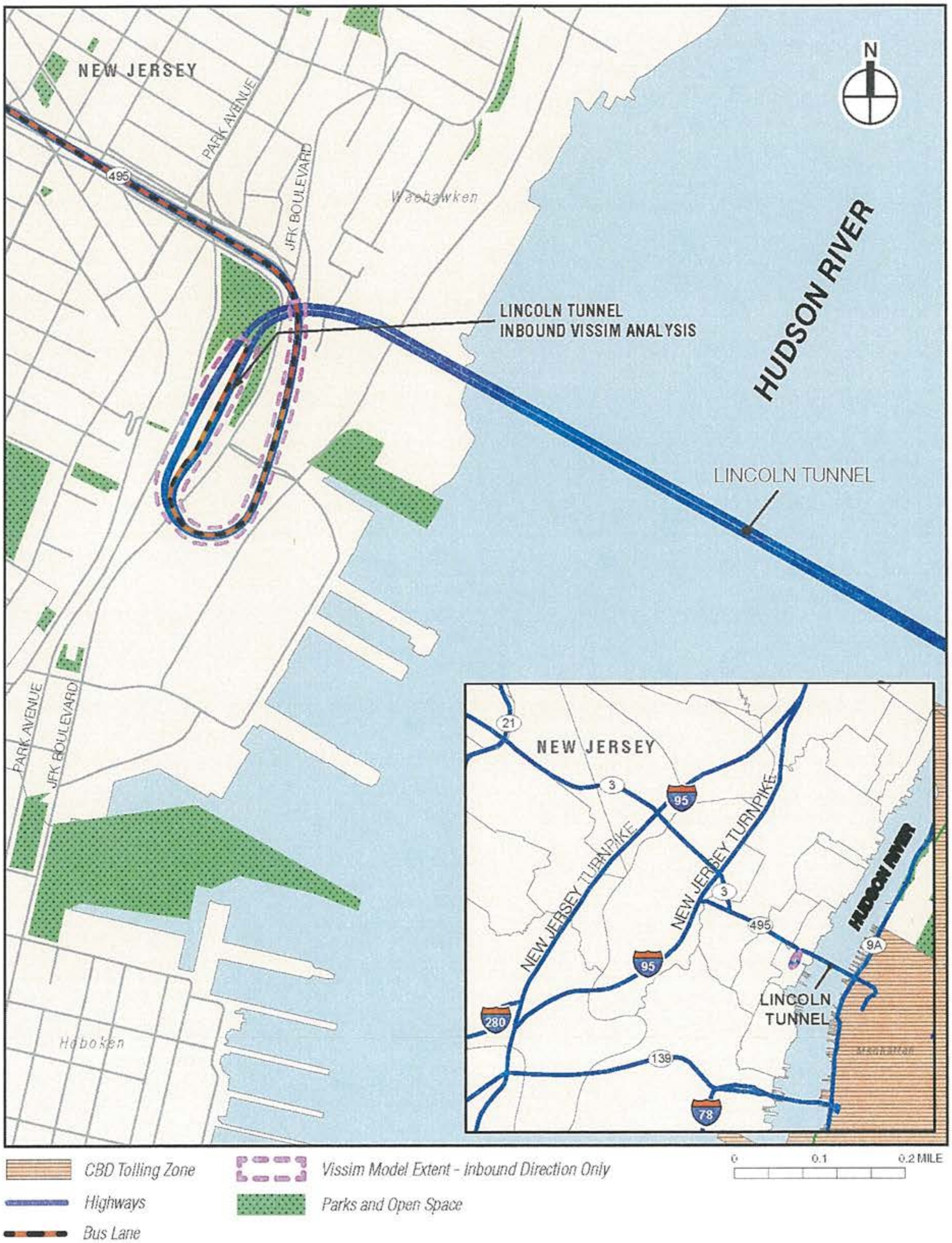
In summary, there would be a net reduction in traffic volumes during the AM (-49), MD (-67), and PM (-63) peak hours at the Manhattan-bound approaches to the Holland Tunnel, and traffic operations would be expected to improve slightly; therefore, there would be no adverse effects as a result of Tolling Scenarios D, E, and F during the AM, MD, and PM peak hours. The net traffic reductions for Tolling Scenarios A, B, C, and G would be expected to be greater than under the remaining tolling scenarios; therefore, there would be expected to be a greater improvement in traffic operations. Since traffic volumes would decrease under all tolling scenarios, there would not be an adverse traffic effect at the Holland Tunnel and its approaches for any tolling scenario being considered.

4B.4.6 NJ Route 495 Approach to the Lincoln Tunnel

The Lincoln Tunnel is a major gateway to Midtown Manhattan from New Jersey. It provides direct access from NJ Route 495 and offers connections to and from the New Jersey Turnpike (I-95), Route 9, Route 3, and local streets in New Jersey (**Figure 4B-7**). In Manhattan, the Lincoln Tunnel provides connections to West 42nd Street, and south to West 30th Street and streets in between via the Lincoln Tunnel Expressway. In addition, the Lincoln Tunnel provides a direct connection for buses to the Port Authority Bus Terminal.

The highway analysis examined only the Manhattan-bound direction where delays and queues occur along NJ Route 495. The New Jersey-bound highway traffic generally operates with less congestion because the volumes are constrained by the tunnel at the Manhattan approaches (which are examined in **Section 4B.6**).

Figure 4B-7. Highways Leading to the Lincoln Tunnel



Source: ESRI, NYC Open Data, NYMTC 2020 TransCAD Highway Network.

AFFECTED ENVIRONMENT

A qualitative highway segment analysis was performed because a reduction in traffic is projected by the BPM during the AM, MD, and PM peak hours. **Table 4B-18** presents a summary of the existing conditions during the weekday AM, MD, and PM peak hours.

Table 4B-18. Existing Conditions: New Jersey Route 495 Approach to the Lincoln Tunnel

PERFORMANCE (2019)	AM (8 a.m. to 9 a.m.)	MD (1 p.m. to 2 p.m.)	PM (5 p.m. to 6 p.m.)
Hourly Volume			
Helix to Lincoln Tunnel Entrance	1,725	1,631	771
Exclusive Bus Lane (BL) to Lincoln Tunnel Entrance	512		
Local Ramps to Lincoln Tunnel Entrance	1,753	714	1,005
Processed Hourly Volume			
Helix to Lincoln Tunnel Entrance	1,731	1,577	775
BL to Lincoln Tunnel Entrance	492		
Local Ramps to Lincoln Tunnel Entrance	1,541	729	957
Travel Time (min:sec)			
Helix to Lincoln Tunnel Entrance	10:45	09:47	02:03
BL to Lincoln Tunnel Entrance	01:31		
Local Ramps to Lincoln Tunnel Entrance	02:23	00:55	04:38
Travel Speed (miles per hour)			
Helix to Lincoln Tunnel Entrance	3.5	3.9	18.4
BL to Lincoln Tunnel Entrance	25.9		
Local Ramps to Lincoln Tunnel Entrance	6.5	17.0	3.4
Maximum Queue (feet)			
Helix to Lincoln Tunnel Entrance	8,443	951	32
BL to Lincoln Tunnel Entrance	0		
Local Ramps to Lincoln Tunnel Entrance	1,289	0	1,681
Density (pc/mi/ln)			
Helix to Lincoln Tunnel Entrance	175	168	10
BL to Lincoln Tunnel Entrance	19		
Level of Service (LOS)			
Helix to Lincoln Tunnel Entrance	F	F	A
BL to Lincoln Tunnel Entrance	C	—	—

Source: WSP, 2022.

Based upon the results of the BPM for Tolling Scenario D, and subsequent post-processing to obtain hourly volumes, there would likely be a small decrease in trips across the Lincoln Tunnel in the Manhattan-bound direction during the AM, MD, and PM peak hours; therefore, a qualitative assessment of potential adverse traffic effects was performed for the CBD Tolling Alternative.

On a typical weekday, the Lincoln Tunnel carries 117,200 vehicles (53,900 Manhattan-bound and 63,300 New Jersey-bound). The following are peak hourly Manhattan-bound traffic volumes:

- 3,990 AM peak hour
- 2,345 MD peak hour
- 1,776 PM peak hour

The average speeds along the helix segment approaching the Lincoln Tunnel are 3.5 mph, 3.9 mph, and 18.4 mph during the AM, MD, and PM peak hours, respectively. The contra-flow XBL converts a New Jersey-bound general traffic lane on I-495 to serve as a Manhattan-bound bus-only lane. The XBL is in effect only during the AM peak period, and buses operate at an average speed of 25.9 mph during the AM peak hour. The general-purpose traffic entrance ramp from Park Avenue in Weehawken, New Jersey, has an average speed of 6.5 mph, 17.0 mph, and 3.4 mph during the AM, MD, and PM peak hours, respectively. The maximum queue lengths along NJ Route 495, measured west of the Lincoln Tunnel portal in New Jersey, are approximately 8,443 feet, 951 feet, and 32 feet during the AM, MD, and PM peak hours, respectively. The queue lengths along the entrance ramp from Park Avenue in Weehawken are approximately 1,289 feet, 0 feet, and 1,681 feet during the AM, MD, and PM peak hours, respectively. The NJ Route 495 approach to the Lincoln Tunnel operates at LOS F during the AM and MD peak hours and at LOS A during the PM peak hour.

ENVIRONMENTAL CONSEQUENCES

For existing conditions and the No Action Alternative and CBD Tolling Alternative Tolling Scenario D, **Table 4B-19** presents a summary of the overall changes in traffic volume at the Lincoln Tunnel approaches for each of the peak hours, and compares the existing conditions, No Action Alternative, and CBD Tolling Alternative. The existing data was derived from 2018 transaction data and adjusted to 2019 values. There is little anticipated change between existing and No Action Alternative conditions, and the assessment summarized below describes the incremental change traffic volumes between the No Action Alternative and Tolling Scenario D.

Table 4B-19. Lincoln Tunnel Traffic Volumes during AM, MD and PM Peak Hours under Existing Conditions, No Action Alternative, and CBD Tolling Alternative

PEA HOUR	EXISTING CONDITIONS	NO ACTION ALTERNATIVE	CBD TOLLING ALTERNATIVE (Tolling Scenario D)
AM (8:00 a.m. to 9:00 a.m.) (including Exclusive Bus Lane)	3,990	3,955	3,869
MD (1:00 p.m. to 2:00 p.m.)	2,345	2,338	2,190
PM (5:00 p.m. to 6:00 p.m.)	1,776	1,780	1,706

Source: WSP, 2022.

In summary, there would be a net reduction in traffic volumes during the AM (-86), MD (-148), and PM (-74) peak hours at the Manhattan-bound approaches to the Lincoln Tunnel, and traffic operations would be expected to improve slightly; therefore, there would be no adverse effects as a result of Tolling Scenarios D, E, and F during the AM, MD, and PM peak hours. The net traffic reductions for Tolling Scenarios A, B, C, and G would be expected to be greater than under the remaining tolling scenarios; therefore, there would be

expected to be a greater improvement in traffic operations. Since traffic volumes would decrease under all tolling scenarios, there would not be an adverse traffic effect at the Lincoln Tunnel and its approaches for any of the tolling scenarios being considered.

AM Results (8:00 a.m. to 9:00 a.m.)

During the AM peak hour, traffic volumes are projected to decrease by approximately 43 vehicles along the helix and 43 vehicles along the Park Avenue ramp, resulting in a small improvement in traffic operations. No additional buses are anticipated on the XBL, which comprises approximately 2.2 percent of total AM peak-hour traffic. Therefore, there would not be an adverse traffic effect during the AM peak hour.

MD Results (1:00 p.m. to 2:00 p.m.)

During the MD peak hour, traffic volumes are projected to decrease by approximately 74 vehicles along the helix and 74 vehicles along Park Avenue ramp, resulting in a small improvement in traffic operations. Therefore, there would not be an adverse traffic effect during the MD peak hour.

PM Results (5:00 p.m. to 6:00 p.m.)

During the PM peak hour, traffic volumes are projected to slightly decrease, by approximately 37 vehicles along the helix and 37 vehicles along Park Avenue ramp, resulting in a small improvement in traffic operations. Therefore, there would not be an adverse traffic effect during the PM peak hour.

4B.4.7 Trans-Manhattan/Cross Bronx Expressway between the George Washington Bridge and I-87

The George Washington Bridge is a major crossing carrying I-95 and US Routes 1 and 9 across the Hudson River for trips between New Jersey and Manhattan as well as the Bronx, Queens, and Brooklyn. I-95 continues along segments known as the Trans-Manhattan Expressway ***[(as it crosses Upper Manhattan)]*** and the Cross Bronx Expressway ***[(through the Bronx)]*** and provides connections to the Henry Hudson Parkway, Major Deegan Expressway, Harlem River Drive, and other local streets and highways (**Figure 4B-8**).

The highway analysis examines only the outbound (westbound/New Jersey-bound) direction of the Trans-Manhattan Expressway where it enters the George Washington Bridge (the convergence and maximum accumulation of vehicles from the feeder roadways to the George Washington Bridge). The BPM forecasts the traffic volumes under the representative tolling scenario in the inbound (eastbound) direction to be lower; therefore, the eastbound direction was not analyzed.

In the outbound (westbound) direction increases in vehicular trips are anticipated to occur along the major connections to the bridge approach due to circumferential diversion of through Manhattan CBD traffic taking advantage of the toll-free trans-Hudson crossings in the westbound direction to avoid the CBD toll.

Projections of changes in traffic volumes along the Trans-Manhattan/Cross Bronx Expressway as well as other feeder routes to the George Washington Bridge are based on existing bridge volume data, BPM projections of changes in traffic volumes, and travel patterns derived from data provided by StreetLight Data, Inc. used to determine the distribution of traffic using the George Washington Bridge.

Figure 4B-8. Highways Leading to the Trans-Manhattan/Cross Bronx Expressway

Source: ESRI, NYC Open Data, NYMTC 2020 TransCAD Highway Network.

Due to the lack of availability of an existing calibrated highway traffic model and gaps in the pre-COVID-19 pandemic traffic data, the analysis of the Trans-Manhattan/Cross Bronx Expressway relies on a combination of analytical quantitative and qualitative evaluation of potential adverse effects. The potential traffic effects along the Trans-Manhattan/Cross Bronx Expressway corridor were estimated from the Long Island Expressway Vissim model with appropriate adjustments for the relative increase in traffic volumes and the initial No Action speeds

AFFECTED ENVIRONMENT

On a typical weekday, the George Washington Bridge carries approximately 300,000 vehicles (145,000 Manhattan-bound and 155,000 New Jersey-bound). The peak-hour westbound/New Jersey-bound traffic volumes for the bridge are:

- 7,028 AM peak hour
- 8,315 MD peak hour
- 9,660 PM peak hour

ENVIRONMENTAL CONSEQUENCES

The incremental changes in traffic resulting from the CBD Tolling Alternative were assigned to the highways leading to the George Washington Bridge using data provided by StreetLight Data, Inc. For each time period, estimates were made as to where the majority of traffic originated from before combining along the Trans-Manhattan Expressway. Over the course of the day, the majority of traffic destined to the George Washington Bridge in the westbound direction comes from the Cross Bronx Expressway, Harlem River Drive, Henry Hudson Parkway and Major Deegan Expressway. **Table 4B-20** presents the proportion of traffic along these main roadways that lead to the George Washington Bridge.

Table 4B-20. Roadway Contribution by Time Period to George Washington Bridge Traffic

HIGHWAY CONNECTIONS TO GEORGE WASHINGTON BRIDGE	AM PEA (6 a.m. to 10 a.m.) Traffic	MD PEA (10 a.m. to 4 p.m.) Traffic	PM PEA (4 p.m. to 8 p.m.) Traffic
Harlem River Drive	29.5%	42.4%	36.7%
Cross Bronx Expressway – Westbound	43.7%	26.6%	26.1%
Henry Hudson Parkway (north- and southbound)	12.9%	17.7%	24.4%
Major Deegan Expressway (north- and southbound)	13.8%	13.4%	12.7%
TOTAL	100.0	100.0	100.0

Source: StreetLight Data, Inc. (2019) and WSP analysis.

Under Tolling Scenario D, there would be increases in traffic across the George Washington Bridge in the westbound/New Jersey-bound direction during the AM, MD, and PM peak hours of 87, 826, and 414 vehicles, respectively. These increases would affect routes feeding the George Washington Bridge, including the Henry Hudson Parkway, the Trans-Manhattan Expressway westbound, the Harlem River Drive, the Major Deegan Expressway, and the Cross Bronx Expressway westbound. **Table 4B-21** summarizes the

incremental changes in westbound/New Jersey-bound traffic along the major highways leading to the George Washington Bridge.

Table 4B-21. Projected Increase in Traffic, compared to the No Action Alternative, along Trans-Manhattan and Cross Bronx Expressway Corridor

FACILITY/HIGHWAY	PEA -HOUR VEHICLES		
	AM	MD	PM
George Washington Bridge	87	826	414
From Henry Hudson Parkway	11	146	101
Trans-Manhattan Expressway	76	680	313
From Harlem River Drive	26	350	152
From Major Deegan Expressway	12	110	53
Cross Bronx Expressway	38	220	108

Source: 2019 Port Authority of New York and New Jersey traffic data at the George Washington Bridge, 2019 StreetLight Data, Inc. origin-destination data, and WSP analysis.

An analytical and qualitative assessment of anticipated traffic effects is presented below during the AM, MD, and PM peak hours based upon the estimated increases in peak hour volumes and estimated levels of congestion.

AM Results (7:00 a.m. to 8:00 a.m.)

During the AM peak hour, traffic volumes are projected to increase by approximately 87 vehicles on the George Washington Bridge, which would be a 1.2 percent increase over existing volumes. Approximately 11 vehicles would be added to the Henry Hudson Parkway, 26 vehicles to Harlem River Drive, 12 vehicles to the Major Deegan Expressway, and 38 vehicles to the Cross Bronx Expressway westbound. These small increases in traffic volumes are well within 5 percent and there would not be a noticeable change in speeds and travel times during the AM peak hour; therefore, there would not be an adverse effect under SEQRA.

MD Results (3:00 p.m. to 4:00 p.m.)

During the MD peak hour, traffic volumes are projected to increase by approximately 826 vehicles on the George Washington Bridge, which would be an 8.8 percent increase over existing volumes. Approximately 146 vehicles would be added to the Henry Hudson Parkway, 350 vehicles to Harlem River Drive, 110 vehicles to the Major Deegan Expressway, and 220 vehicles to the Cross Bronx Expressway westbound. It is expected that delays and travel times along these roadways would increase during the MD peak hour. Along the Cross Bronx Expressway and the Trans-Manhattan Expressway, the increases in projected volumes would be considered an adverse effect under the volume increase criteria of greater than 5 percent used to determine adverse effects under SEQRA.

Adverse effects that would arise if Tolling Scenario D or another similar tolling scenario were implemented will be minimized through implementing Transportation Demand Management measures such as ramp metering, motorist information, signage, and/or targeted toll policy modifications to reduce diversions. The Project Sponsors will undertake monitoring of traffic patterns specifically tailored to the adopted tolling scenario—commencing prior to implementation with data collection approximately 3 months after the start of project operations—to determine whether the predicted adverse effects are occurring and to

determine the appropriate Transportation Demand Management measures (or improvement in existing Transportation Demand Management measures) to be implemented. The monitoring program will examine changes in traffic volumes, changes in speeds, and changes in delays along the affected highway corridors. Volume changes will be determined from before/after traffic counts (where available); speed changes will be determined from actual before/after speeds based on data provided by StreetLight Data, Inc.; and the change in delay along major highway corridors will be determined based on actual speeds based on data provided by StreetLight Data, Inc. The monitoring program will inform the development and implementation of appropriate Transportation Demand Management measures and ***[subsequently]*** possible adjustments to the tolling policy should traffic volumes increase by more than 5 percent and delays increase 2.5 minutes ***[or more]***.

PM Results (5:00 p.m. to 6:00 p.m.)

During the PM peak hour, traffic volumes are projected to increase by approximately 414 vehicles on the George Washington Bridge, which would be a 4.3 percent increase over existing volumes. Approximately 101 vehicles would be added to the Henry Hudson Parkway, 152 vehicles to Harlem River Drive, 53 vehicles to the Major Deegan Expressway, and 108 vehicles to the Cross Bronx Expressway westbound. These relatively small increases in traffic volumes would be within the 5 percent threshold, and there would not be an adverse effect under SEQRA.

4B.4.8 FDR Drive/Lower East Side—East 10th Street to the Brooklyn Bridge

ENVIRONMENTAL CONSEQUENCES

As with the Trans-Manhattan/Cross Bronx Expressway corridor, to be able to appropriately address the questions and concerns expressed by communities affected by any traffic changes in this corridor, additional traffic counts were obtained to complete further analysis. Under the CBD Tolling Alternative, the FDR Drive would experience a net decline in traffic at 60th Street, resulting in improved travel times and operating conditions along the upper FDR Drive and the segment between East 23rd Street and East 60th Street. However, the lower FDR Drive between East 10th Street and the Brooklyn Bridge would experience a net increase in traffic, with diverted traffic greater than the suppression of traffic due to CBD tolling. Under all tolling scenarios, the FDR Drive would become a more competitive route for some origin-destination pairs, thereby offsetting the overall decline in projected traffic along the FDR Drive in this specific area south of East 10th Street.

The highest projected increase in traffic along the lower FDR Drive would occur under Tolling Scenarios D, E, and F, which have the highest levels of discounts, exemptions, and crossing credits and therefore the highest tolls that would result in the greatest levels of diversions and changes in travel patterns. The BPM analyses showed a potential 5 percent to 9 percent increase in daily traffic volumes along the northbound FDR Drive and a 19 percent to 26 percent increase in daily traffic volumes along the southbound FDR Drive in the section between East 10th Street and the Brooklyn Bridge.

Based upon a select link analysis[22] of the lower FDR Drive, the net increase in traffic in this segment would come from three primary markets:

- **Queens:** Under the CBD Tolling Alternative, with the reduction in lanes along the BQE as part of the No Action Alternative from three lanes to two lanes in each direction, some trips from Queens to Brooklyn would divert to the Ed Koch Queensboro Bridge upper level, then to the southbound FDR Drive, and then to the Brooklyn Bridge (or Hugh L. Carey Tunnel) to bypass congestion on the BQE. This alternate routing, a toll-free route, would become more attractive under the CBD Tolling Alternative due to an overall reduction of traffic along the upper portion of the FDR Drive between 60th Street and West 23rd Street. The higher the CBD toll, the more traffic would be suppressed along the upper FDR Drive and the more attractive the FDR Drive becomes as a toll-free alternative to the BQE for travel between Queens and Brooklyn. The BPM does not show a northbound diversion from Brooklyn to Queens trips because this route would be tolled under all tolling scenarios because it would require re-entry into the CBD zone via a local street to access one of the East River crossings to Queens.
- **The Bronx:** Some trips between Bronx and Brooklyn would use the FDR Drive as an alternate to the congested BQE via the Third Avenue Bridge and the Willis Avenue Bridge, which would provide a toll-free connection between the Major Deegan Expressway (I-87) and the FDR Drive.
- **North Bergen County:** Some trips between North Bergen County and Brooklyn would divert to the FDR Drive as an alternative to the West Side Highway/Route 9A and local streets used to access the Brooklyn Bridge.

Table 4B-22 summarizes the changes in traffic volumes along the FDR Drive between East 10th Street and the Brooklyn Bridge.

22 A select link analysis examines all trips using a particular highway segment and tracks the volume of traffic using the link from each origin-destination zone. This type of analysis allows a detailed review of travel pattern and routing changes.

Table 4B-22. Estimated Increase of Traffic on the Lower FDR Drive*

PERIOD		NORTHBOUND Low	NORTHBOUND High	SOUTHBOUND Low	SOUTHBOUND High
AM	Peak Period	1,586	1,871	1,947	2,735
	Peak Hour	324	370	294	356
MD	Peak Period	1,219	1,535	2,524	4,117
	Peak Hour	249	313	281	458
PM	Peak Period	83	403	1,776	2,918
	Peak Hour	61	231	404	666
Daily		2,352	4,472	8,845	12,145

Source: WSP, 2022.
Notes:
1. Daily volumes will not equal peak-period increments due to values being pulled from differing tolling scenarios.
2. Peak-period increments are from the BPM (unadjusted).
3. Peak-hour volumes are estimated using an average and adjusted for accuracy.
4. Low = Tolling Scenarios A, B, C, and G
5. High = Tolling Scenarios D, E, and F

* NYCDOT reduced the number of lanes on the BQE from three lanes to two lanes in each direction on August 30, 2021, between Atlantic Avenue and Sands Street, to preserve the life of the cantilever structure. This has caused some motorists to divert to the FDR Drive. The Project is expected to cause additional motorists to divert to the FDR Drive to avoid congestion along the BQE.

AM Peak Hour (8:00 a.m. to 9:00 a.m.)

In the northbound direction, the AM peak-hour volume is expected to increase by about 324 to 370 vehicles. Typically, traffic flows freely along the lower FDR Drive in the northbound direction during the AM peak and it is anticipated that the additional traffic can be accommodated. In the southbound direction, the AM peak-hour volume is expected to increase by about 294 to 356 vehicles. Typically, traffic flows freely along the lower FDR Drive in the southbound direction during the AM peak, and it is anticipated that the additional traffic can be accommodated for all tolling scenarios.

MD Peak Hour (1:00 p.m. to 2:00 p.m.)

In the northbound direction, the MD peak-hour volume is expected to increase by about 249 to 313 vehicles. Typically, traffic flows freely along the lower FDR Drive in the northbound direction during the MD peak and it is anticipated that the additional traffic can be accommodated. In the southbound direction, the peak-hour volume is expected to increase by about 281 to 458 vehicles. Typically, traffic flows freely along the lower FDR Drive in the southbound direction during the MD peak, and it is anticipated that the additional traffic can be accommodated for all tolling scenarios.

PM Peak Hour (5:00 p.m. to 6:00 p.m.)

In the northbound direction, the PM peak-hour volume is expected to increase by about 61 to 231 vehicles. Typically, traffic flows freely along the lower FDR Drive in the northbound direction during the PM peak and it is anticipated that the additional traffic can be accommodated for all scenarios, aside from Tolling Scenario B. Under this tolling scenario, the projected increase in traffic volume would be marginally above the 5 percent threshold (at 5.8 percent), resulting in potential adverse effects.

In the southbound direction, the PM peak-hour volume is expected to increase by about 404 to 666 vehicles depending on the tolling scenario. Typically, there is severe congestion along the lower FDR Drive in the southbound direction during the PM peak, and it is not anticipated that the additional traffic can be accommodated without adverse effects. Since the FDR Drive southbound is congested during the PM peak hour and the increase in volume would exceed the 5 percent threshold, an adverse traffic effect is projected.

In summary, all tolling scenarios would result in increases in daily and peak-hour traffic along the lower FDR Drive, between East 10th Street and the Brooklyn Bridge by more than the 5 percent threshold. Tolling Scenarios A, B, and G are generally anticipated to have lower potential increases in traffic volumes, and Tolling Scenarios D, E, and F are anticipated to have higher increases in traffic volumes, with some variation based on direction. Tolling Scenario C is anticipated to have increases in traffic volumes somewhere in the middle.

In the northbound direction, projected increases in traffic volumes would be lower than in the southbound direction, and there is capacity along the lower FDR Drive to handle some or all of the additional traffic without causing adverse effects during the AM and MD peak hours. However, during the PM peak hour, it is not anticipated that the additional traffic can be accommodated without some potential adverse effects under Tolling Scenario B. However, the adverse effects in the northbound direction are expected to be marginal.

In the southbound direction, potential diversions to the FDR Drive would be higher. Typically, traffic moves freely in this segment, except during the PM peak period when there is severe congestion. It is anticipated that sufficient reserve capacity is available to handle the expected increase in traffic during the AM and MD peak hours for some of the tolling scenarios without adverse effects. However, during the PM peak hour when traffic congestion is prevalent, it is not anticipated that the additional traffic can be accommodated without adverse effects. Therefore, an adverse traffic effect is projected during the PM peak hour in the southbound direction.

Adverse effects that would arise if Tolling Scenario D or another similar tolling scenario were implemented will be minimized through implementing Transportation Demand Management measures such as ramp metering, motorist information, signage, and/or targeted toll policy modifications to reduce diversions. The Project Sponsors will undertake monitoring of traffic patterns specifically tailored to the adopted tolling scenario—commencing prior to implementation with data collection approximately 3 months after the start of project operations—to determine whether the predicted adverse effects are occurring and to determine the appropriate Transportation Demand Management measures (or improvement in existing Transportation Demand Management measures) to be implemented. The monitoring program will examine changes in traffic volumes, changes in speeds, and changes in delays along the affected highway corridors. Volume changes will be determined from before/after traffic counts (where available); speed changes will be determined from actual before/after speeds based on data provided by StreetLight Data, Inc.; and the change in delay along major highway corridors will be determined based on actual speeds based on data provided by StreetLight Data, Inc. The monitoring program will inform the development and

implementation of appropriate Transportation Demand Management measures and ***[subsequent]*** possible adjustments to the tolling policy should traffic volumes increase by more than 5 percent and delays increase ***[by]*** 2.5 minutes ***[or more]***.

4B.4.9 Bayonne Bridge

AFFECTED ENVIRONMENT

The highway segment analysis was performed using an HCS with incremental volumes from BPM analyses. The analysis provides performance metrics including speed, density (in passenger cars per mile per lane) and overall LOS. **Table 4B-23, Table 4B-24, Table 4B-25, and Table 4B-26** present a summary of existing, No Action Alternative, and CBD Tolling Alternative (Tolling Scenario D) conditions during the weekday AM, MD, PM, and LN peak hour. A map of the analyzed location is shown in **Figure 4B-9.**

ENVIRONMENTAL CONSEQUENCES

For existing conditions and the No Action Alternative and CBD Tolling Alternative Tolling Scenario D, **Table 4B-23, Table 4B-24, Table 4B-25, and Table 4B-26**present a summary of the overall changes in traffic volume at the Bayonne Bridge for each of the peak hours, and compares the existing conditions, No Action Alternative, and CBD Tolling Alternative. The existing data was obtained from BPM. There is little anticipated change between the No Action Alternative and CBD Tolling Alternative (Tolling Scenario D), the assessment summarized below describes the incremental change in traffic volumes between the No Action Alternative and Tolling Scenario D.

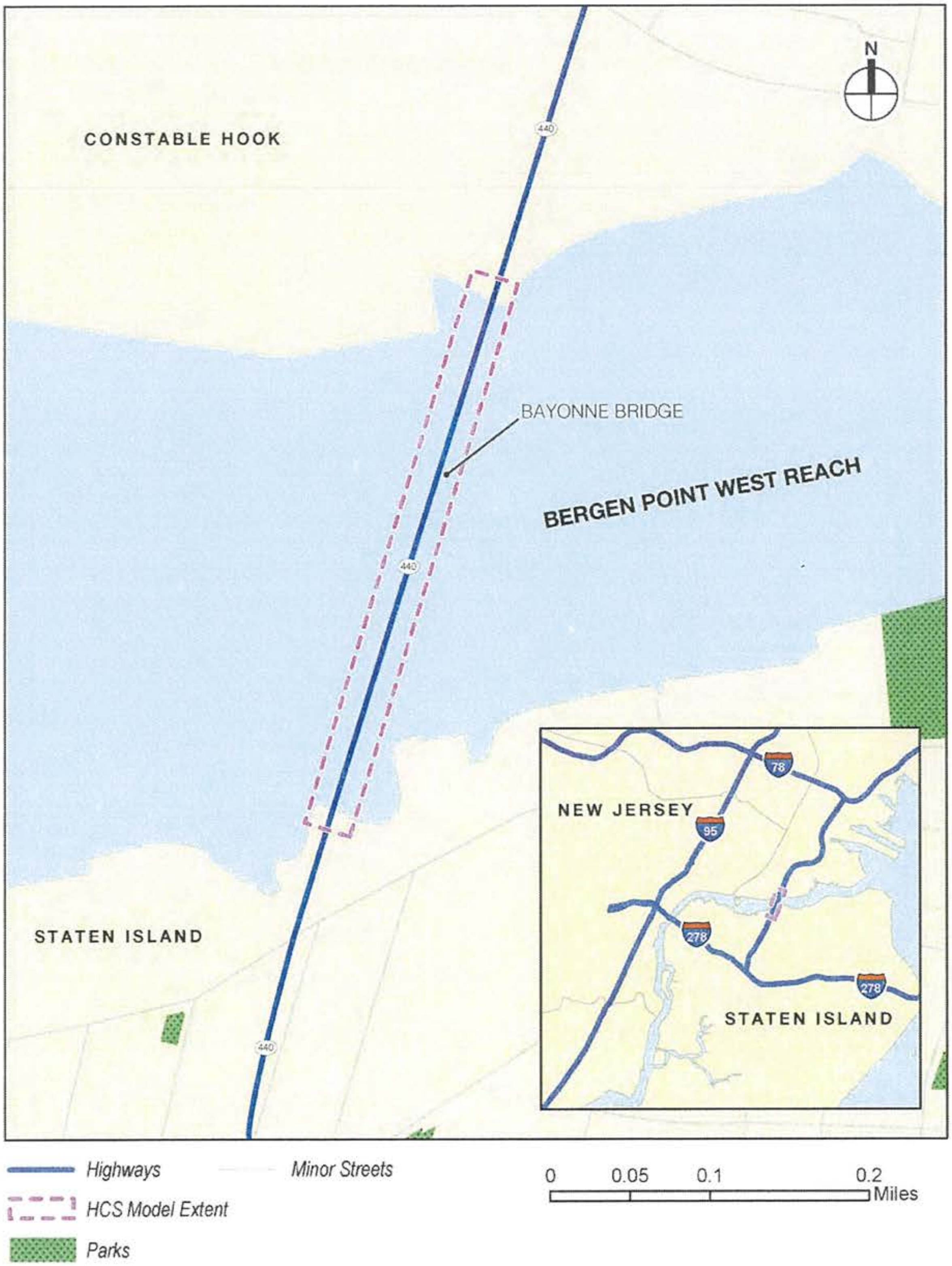
In summary, there would be a net increase in northbound traffic volumes during the AM (376), MD (317), PM (213), and LN (54) peak hours at the Bayonne Bridge. There would be a net increase in southbound traffic volumes during the AM (81), MD (97), PM (148), and LN (1) peak hours at the Bayonne Bridge. There would be no adverse effects as a result of the tolling scenarios with the largest traffic increases during the AM, MD, PM, and LN peak hours. Since traffic volumes would increase by less under the other tolling scenarios, there would not be an adverse traffic effect for any of the tolling scenarios being considered.

AM Results

With CBD tolling, traffic in the northbound direction is projected to increase by approximately 376 vehicles heading into New Jersey. This would result in the northbound density along Route 440 to increase by approximately 4.9 pc/mi/ln and the LOS would decrease from LOS B to LOS C. Under the SEQRA criteria, LOS C during the AM peak hour is considered acceptable and, therefore, is not considered to create an adverse effect.

Traffic in the southbound direction is projected to increase by approximately 81 vehicles heading into Staten Island. This would result in the southbound density along Route 440 to increase by approximately 1 pc/mi/ln and the LOS would decrease from LOS A to LOS B. Under the SEQRA criteria, LOS B during the AM peak hour is considered acceptable and, therefore, is not considered to create an adverse effect.

Figure 4B-9. Highways Leading to the Bayonne Bridge



Source: WSP,, 2022.

MD Results

With CBD tolling, traffic in the northbound direction is projected to increase by approximately 317 vehicles heading into New Jersey. This would result in the northbound density along Route 440 to increase by approximately 4.3 pc/mi/ln and the LOS would decrease from LOS A to LOS B. Under the SEQRA criteria, LOS B during the MD peak hour is considered acceptable and, therefore, is not considered to create an adverse effect.

Traffic in the southbound direction is projected to increase by approximately 97 vehicles heading into Staten Island. This would result in the southbound density along Route 440 to increase by approximately 1.3 pc/mi/ln and the LOS would remain LOS A. Under the SEQRA criteria, LOS A during the MD peak hour is considered acceptable and, therefore, is not considered to create an adverse effect.

PM Results

With CBD tolling, traffic in the northbound direction is projected to increase by approximately 213 vehicles heading into New Jersey. This would result in the northbound density along Route 440 to increase by approximately 2.8 pc/mi/ln and the LOS would remain LOS A. Under the SEQRA criteria, LOS A during the PM peak hour is considered acceptable and, therefore, is not considered to create an adverse effect.

Traffic in the southbound direction is projected to increase by approximately 148 vehicles heading into Staten Island. This would result in the southbound density along Route 440 to increase by approximately 1.8 pc/mi/ln and the LOS would remain LOS B. Under the SEQRA criteria, LOS B during the PM peak hour is considered acceptable and, therefore, is not considered to create an adverse effect.

LN Results

With CBD tolling, traffic in the northbound direction is projected to increase by approximately 54 vehicles heading into New Jersey. This would result in the northbound density along Route 440 to increase by approximately 0.7 pc/mi/ln and the LOS service would remain LOS A. Under the SEQRA criteria, LOS A during the LN peak hour is considered acceptable and, therefore, is not considered to create an adverse effect.

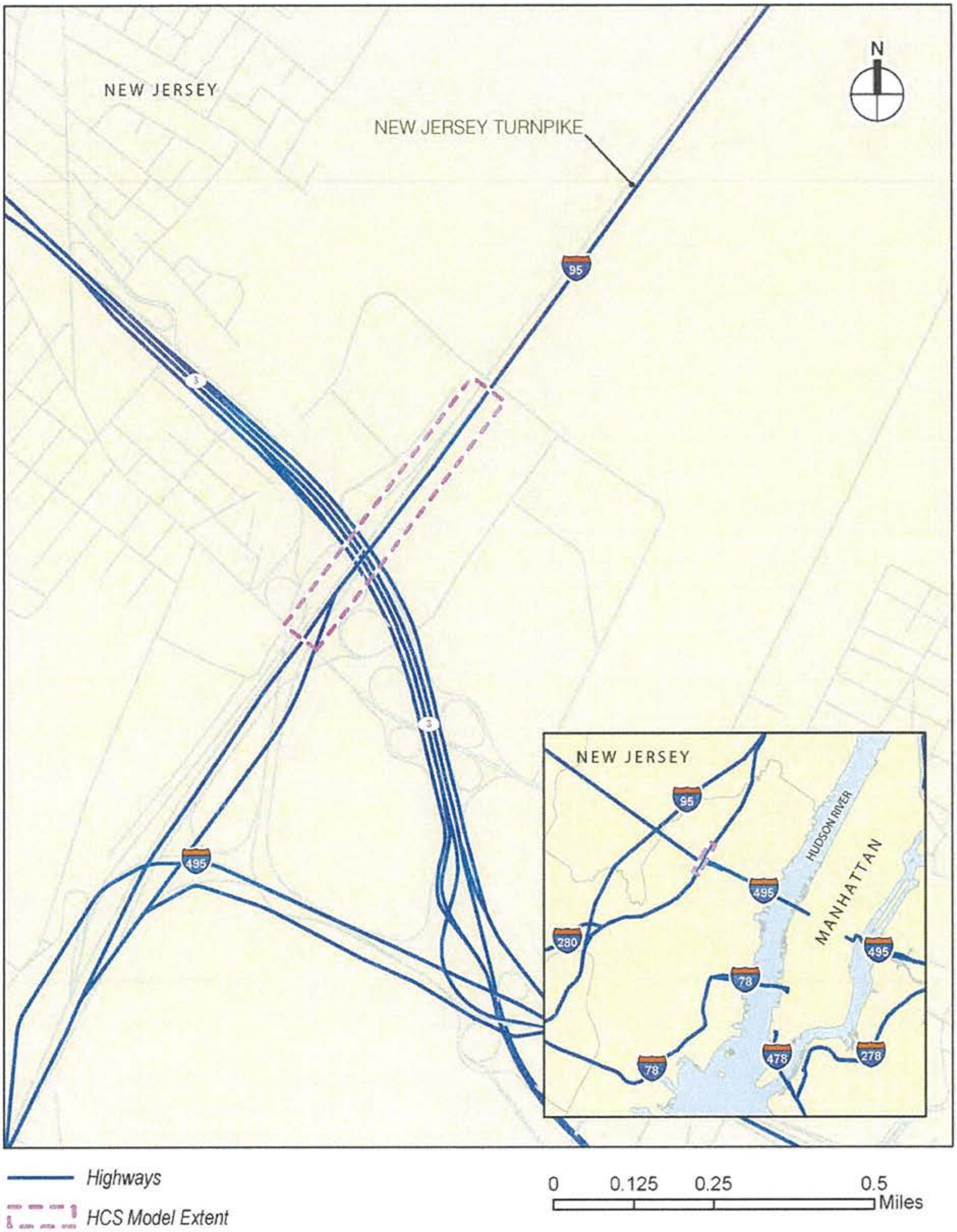
Traffic in the southbound direction is projected to increase by approximately one vehicle heading into Staten Island. This would result in the southbound density along Route 440 to increase by approximately 0 pc/mi/ln and the LOS would remain LOS A. Under the SEQRA criteria, LOS A during the LN peak hour is considered acceptable and, therefore, is not considered to create an adverse effect.

4B.4.10 Eastern Spur of I-95 New Jersey Turnpike

AFFECTED ENVIRONMENT

The highway segment analysis was performed using an HCS with existing volumes from BPM analyses. The analysis provides performance metrics including density (in passenger cars per mile per lane) and overall LOS. **Table 4B-23, Table 4B-24, Table 4B-25, and Table 4B-26** present a summary of existing, No Action Alternative, and CBD Tolling Alternative Scenario D conditions during the weekday AM, MD, PM, and LN peak hour. A map of the analyzed location is shown in **Figure 4B-10.**

Figure 4B-10. Highways Leading to the Eastern Spur of I-95



Source: WSP, 2022.

ENVIRONMENTAL CONSEQUENCES

For existing conditions and the No Action Alternative and CBD Tolling Alternative Tolling Scenario D, **Table 4B-23, Table 4B-24, Table 4B-25, and Table 4B-26** present a summary of the overall changes in traffic volume at the I-95 eastern spur for each of the peak hours, and compares the existing conditions, No Action Alternative, and CBD Tolling Alternative. The existing data was obtained from the BPM. There is little anticipated change between the No Action Alternative and CBD Tolling Alternative Tolling Scenario D. The assessment summarized below describes the incremental change in traffic volumes between the No Action Alternative and Tolling Scenario D.

In summary, there would be a net increase in northbound traffic volumes during the AM (53), MD (63), PM (80) peak hour and a net decrease during the LN (-16) peak hour at the Bayonne Bridge. There would be a net increase in southbound traffic volumes during the AM (98), MD (218), PM (56), and LN (104) peak hours at the Eastern Spur of the New Jersey Turnpike. There would be no adverse effects as a result of the tolling scenarios with the largest increases in traffic volumes during the AM, MD, PM, and LN peak hours. Since traffic volumes would increase by less under the other tolling scenarios, there would not be an adverse traffic effect for any of the tolling scenarios being considered.

AM Results

With CBD tolling, traffic in the northbound direction to the George Washington Bridge is projected to increase by approximately 53 vehicles. This would result in the northbound density along I-95 to increase by approximately 0.4 pc/mi/ln and the LOS would remain LOS A. Under the SEQRA criteria, LOS A during the AM peak hour is considered acceptable and, therefore, is not considered to create an adverse effect.

Traffic in the southbound direction from the George Washington Bridge is projected to increase by approximately 98 vehicles. This would result in the southbound density along I-95 to increase by approximately 0.6 pc/mi/ln and the LOS would remain LOS A. Under the SEQRA criteria, LOS A during the AM peak hour is considered acceptable and, therefore, is not considered to create an adverse effect.

MD Results

With CBD tolling, traffic in the northbound direction to the George Washington Bridge is projected to increase by approximately 63 vehicles. This would result in the northbound density along I-95 to increase by approximately 0.4 pc/mi/ln and the LOS would remain LOS A. Under the SEQRA criteria, LOS A during the MD peak hour is considered acceptable and, therefore, is not considered to create an adverse effect.

Traffic in the southbound direction from the George Washington Bridge is projected to increase by approximately 218 vehicles. This would result in the southbound density along I-95 to increase by approximately 1.7 pc/mi/ln and the LOS would remain LOS A. Under the SEQRA criteria, LOS A during the MD peak hour is considered acceptable and, therefore, is not considered to create an adverse effect.

PM Results

With CBD tolling, traffic in the northbound direction to the George Washington Bridge is projected to increase by approximately 80 vehicles. This would result in the northbound density along I-95 to increase by approximately 0.5 pc/mi/ln and the LOS would remain LOS A. Under the SEQRA criteria, LOS A during the PM peak hour is considered acceptable and, therefore, is not considered to create an adverse effect.

Traffic in the southbound direction from the George Washington Bridge is projected to increase by approximately 56 vehicles. This would result in the southbound density along I-95 to increase by approximately 0.4 pc/mi/ln and the LOS would remain LOS A. Under the SEQRA criteria, LOS A during the PM peak hour is considered acceptable and, therefore, is not considered to create an adverse effect.

LN Results

With CBD tolling, traffic in the northbound direction to the George Washington Bridge is projected to decrease by approximately 16 vehicles. This would result in the northbound density along I-95 to decrease by approximately 0.2 pc/mi/ln and the LOS would remain LOS A. Under the SEQRA criteria, LOS A during the LN peak hour is considered acceptable and therefore is not considered to create an adverse effect.

Traffic in the southbound direction from the George Washington Bridge is projected to increase by approximately 104 vehicles. This would result in the southbound density along I-95 to increase by approximately 0.8 pc/mi/ln and the LOS would remain LOS A. Under the SEQRA criteria, LOS A during the LN peak hour is considered acceptable and, therefore, is not considered to create an adverse effect.

4B.4.11 RFK Bridge between Queens and Ramps to/from Manhattan

AFFECTED ENVIRONMENT

The highway segment analysis was performed using the HCS with existing volumes and incremental volumes from BPM analyses. The analysis provides performance metrics including density (in passenger cars per mile per lane) and overall LOS. **Table 4B-23, Table 4B-24, Table 4B-25, and Table 4B-26** present a summary of existing, No Action Alternative, and CBD Tolling Alternative Scenario D conditions during the weekday AM, MD, PM, and LN peak hour. **Figure 4B-11** shows the analyzed location.

ENVIRONMENTAL CONSEQUENCES

For existing conditions and the No Action Alternative and CBD Tolling Alternative Tolling Scenario D, **Table 4B-23, Table 4B-24, Table 4B-25, and Table 4B-26** present a summary of the overall changes in traffic volume at the RFK Bridge (between Queens and ramps to/from Manhattan) for each of the peak hours, and compares the existing conditions, No Action Alternative, and CBD Tolling Alternative. The existing data was obtained from BPM. There is an anticipated change between the No Action Alternative and Tolling Scenario D, the assessment summarized below describes the incremental change in traffic volumes between the No Action Alternative and Tolling Scenario D.

In summary, there would be a net increase in northbound traffic volumes during the AM (508), MD (261), PM (634), and LN (93) peak hours at the RFK Bridge. There would be a net increase in southbound traffic volumes during the AM (396), MD (474), PM (612), and LN (598) peak hours at the RFK Bridge. There would be potential change in LOS from D to marginally E under the tolling scenarios with the largest increases in local traffic volumes during the AM and PM peak hours. However, the speeds would remain about the same or slightly lower at approximately 40 mph and delays would be below the 2.5-minute threshold. Therefore, there would not be an adverse effect at the RFK under any of the tolling scenarios in both the northbound and southbound directions. Therefore, there would not be an adverse traffic effect at the RFK Bridge.